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Rusts and other diseases of small grains, page 242, are reported from Texas by C. H. Rogers, from Indiana by Ralph M. Caldwell, from Kansas by L. E. Melchers and by C. O. Johnston, and from California by C. A. Suneson.

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A report on the incidence of tobacco diseases in Canada last year is contributed by G. H. Berkeley, page 246.

Tobacco seedbed diseases observed in Wisconsin this year are reported by James Johnson, page 250.

Further spread of tobacco downy mildew in Massachusetts is reported by O. C. Boyd, page 251. R. G. Henderson, Paul R. Miller, and James Godkin report additional records of field infection in Virginia, page 252.

M. F. Barrus reports the first observation of alternaria rot of potato tubers in New York, page 252.

Downy mildew is appearing in commercial onion fields in New York according to A. G. Newhall, page 252.

Woody plants found to be affected by verticillium wilt in Illinois are listed by J. C. Carter, page 253.

Theodore J. Grant lists some additional records of the occurrence of witches'-broom of black locust, page 255.

Brief notes on plant diseases, page 256, include reports of snapdragon rust on resistant varieties in Louisiana, by A. G. Plakidas; plum pockets in Massachusetts, by O. C. Boyd; the occurrence of the X-disease of peach in New York by S. R. Shapley; and southern sclerotial rot on sugar beet in Arizona, by J. G. Brown.

ADDITIONS TO THE LIST OF PLANTS ATTACKED BY THE ROOT-KNOT NEMATODE (HETERODERA MARIONI)

Compiled by

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Introductory Note

In 1933 the Division of Nematology, U. S. Department of Agriculture compiled a list of 855 species of plants known to be attacked by the root-knot nematode, Heterodera marioni (Cornu 1879) Goodey 1932. (Edna M. Buhrer, Corinne Cooper and G. Steiner: Plant Disease Reporter 17: 64-96). Since that time so many more such plants have been published or brought to their attention that it was thought advisable to publish an addition to that original list.

The same difficulties attended the compilation of this list, e.g. the correct botanical nomenclatorial placing of names as published by the various recorders of host plants. Through the courtesy of Mr. B. Y. Morrison of the Division of Plant Exploration and Introduction, U. S. Department of Agriculture, Dr. S. F. Blake and Mr. O. M. Freeman again checked the scientific and common names. We are greatly indebted for their services.

The same pattern has been followed in this list of additions as was used in the 1933 list, and explanations thereof need not be repeated here. For further information the reader is referred to the introductory paragraphs of that list.

Each host plant is listed alphabetically under its accepted scientific name (numbered, and in capital letters), under its synonym if such is found published in nematological or plant pathological literature (in small letters and parentheses), and under its common names if such are in general use (in small letters without parentheses). Horticultural varieties of plants that have come to our attention as hosts of this nematode are listed but not numbered when the species to which they are referred occurred in the 1933 list. Hosts known to be affected in any degree by Heterodera marioni in continental U.S.A. are marked *; those reported from continental U.S.A. since their inclusion in the 1933 list are re-listed and marked *, but are not numbered. Host plants observed by members of the Division of Nematology are marked +. The marks are placed with the accepted scientific names only.

Abaca, MUSA TEXTILIS
856. ABELIA CHINENSIS, Chinese abelia
857. ABELIA SPATHULATA

* 858. ABELIA SP.
(Abelmoschus esculentus) = HIBISCUS ESCULENTUS, Okra
859. ABUTILON EETVELDEANUM
860. ABUTILON INDICUM
* 861. ACACIA BAILEYANA, Cootamundra wattle
* 862. ACACIA CULTRIFORMIS, Knife acacia
(Acacia floribunda) = ACACIA LONGIFOLIA FLORIBUNDA, Gossamer wattle
* 863. ACACIA LONGIFOLIA FLORIBUNDA (A. floribunda), Gossamer wattle
* 864. ACACIA MELANOXYLON, Blackwood acacia
* 865. ACACIA PODALYRIAEFOLIA, Pearl acacia
* 866. ACACIA SALIGNA, Willow acacia
To ACACIA SP. add var. RUSTICA
867. ACANTHOSPERMUM XANTHOIDES
+* 868. ACHILLEA LANULOSA
Aconitum napellus roseum - Grower's label; botanical identity uncertain
+* 869. ACONITUM SP., Monkshood
870. ADROMISCHUS TRIGYNUS (misprinted Andromischus trigynus)
+* 871. AGAPANTHUS UMBELLATUS, Agapanthus
872. ALBIZZIA FALCATA
873. ALBIZZIA LEBBEK, Lebbek
874. ALBIZZIA STIPULATA
Alfileria, ERODIUM CICUTARIUM
Algaroba, PROSOPIS CHILENSIS
875. ALLIUM SATIVUM, Garlic
\+ 876. ALOE VERECUNDA
877. ALOE SP.
+* 878. ALTERNANTHERA PHYLLOXEROIDES
(Alyogyne hakeaefolia) = CIENFUEGOSIA HAKEAEFOLIA (Synonymy is a correction made upon original host list of 1933)
879. AMARANTHUS GANGETICUS, Ganges amaranth
* 880. AMARANTHUS GRACILIS, Pigweed
To AMYGDALUS COMMUNIS add var. AMARA
* 881. AMYGDALUS PERSICA NECTARINA, Nectarine
882. ANAGALLIS ARVENSIS, Red pimpernel
(Andromischus trigynus) misprint for ADROMISCHUS TRIGYNUS
883. ANEMONE CERNUA
Anemone magellanica - Grower's label; botanical identity uncertain
\+ 884. ANEMONE NEMOROSA, European wood anemone
Also Hort. vars. ROBINSON ANEMONE, BLUE BONNET, and ROYAL BLUE
885. ANGELONIA SALICARIAEFOLIA
Antennaria dioica tomentosa - Grower's label; botanical identity uncertain
* 886. ANTIRRHINUM COULTERIANUM, Chaparral snapdragon
* 887. ANTIRRHINUM GLANDULOSUM
* 888. ANTIRRHINUM NUTTALLIANUM

889. ANTIRRHINUM SP., Hort. var., Snapdragon
890. APHELANDRA NITENS
Aralea moseri - Botanical identity uncertain
* 891. ARCTOTIS STOECHADIFOLIA, Bushy arctotis
892. ARDISIA JAPONICA
* 893. ARTEMISIA SACRORUM VIRIDIS
Artichoke, CYNARA SCOLYMUS
\+ 894. ARTOCARPUS COMMUNIS
895. ARTOCARPUS INCISA, Breadfruit
Also var. SEMINIFERA
896. ARTOCARPUS INTEGRA (Artocarpus integrifolia), Jackfruit
Asparagus-bean, VIGNA SESQUIPEDALIS
+* 897. ASPARAGUS PLUMOSUS, Fern asparagus
* 898. ASPARAGUS SPRENGERI, Sprenger asparagus
899. ASPERULA NITIDA
* 900. ASTER TRADESCANTI, Michaelmas-daisy
* To ASTER SP. add *
* 901. ATRIPLEX BREWERI
* 902. AVENA BARBATA
* 903. AVENA FATUA, Wild oat
Avens, GEUM SP.
Banana, ladyfinger, MUSA PARADISIACA CHAMPA
Barberry, BERBERIS SP.
Barberry, Sargent, BERBERIS SARGENTIANA
Basil, OCIMUM SP.
Beggar-weed, three-flowered, MEIBOMIA TRIFLORA
+* To BEGONIA COCCINEA add: +* var. LUCERNA
\+ 904. BEGONIA SEMPERFLORENS var. VERNON
+* To BEGONIA SP. add vars. LORRAINE and HYBRIDA MULTIFLORA and +* vars. PRIMA DONNA X CHRISTMAS CHEER, and Hyb. of Tuberous type
Bellflower, CAMPANULA SP.
* 905. BERBERIS AQUIFOLIUM, Orange hollygrape
906. BERBERIS SARGENTIANA, Sargent barberry
907. BERBERIS SP., Barberry
908. BERRIA AMMONILLA
Betony, field, STACHYS ARVENSIS
909. BIDENS PILOSA, Sticktight
910. BIGNONIA SP. var. MADAM GALEN
Bindweed, CONVOLVULUS ARVENSIS
Bloodleaf, linden, IRESINE LINDENI
911. BRASSICA INTEGRIFOLIA
Breadfruit, ARTOCARPUS INCISA
Bristlegrass, bur, SETARIA VERTICILLATA
Bristlegrass, green, SETARIA VIRIDIS
Broom, GENISTA SP.
912. BROUSSONETIA KAZINOKI
+* 913. BROWALLIA VISCOSA

* 914. BUDDLEIA ASIATICA, White butterflybush
915. BUDDLEIA COLVILLEI
* 916. BUDDLEIA DAVIDII SUPERBA (B. superba)
(Buddleia superba) = BUDDLEIA DAVIDII SUPERBA
917. BULBINELLA HOOKERI (Chrysobactron hookeri)
Burclover, MEDICAGO HISPIDA
Butterflybush, white, BUDDLEIA ASIATICA
Butterflyflower, SCHIZANTHUS SP.
Buttonweed, DIODIA TERES
Calliopsis, COREOPSIS TINCTORIA
* 918. CALONYCTION SP., Moonflower
919. CALOPHACA WOLGARICA
920. CAMELLIA JAPONICA, Common camellia
(Camellia thea) = THEA SINENSIS, Tea
(Camellia theifera) = THEA SINENSIS, Tea
+* 921. CAMPANULA MEDIUM, Canterbury-bells
922. CAMPANULA SP., Bellflower
Canaigre, RUMEX HYMENOSEPALUS
(Cannabis indica) = CANNABIS SATIVA
CANNABIS SATIVA (Cannabis indica), Common hemp
Canterbury-bells, CAMPANULA MEDIUM
Cape-gooseberry, PHYSALIS SP., or PHYSALIS EDULIS
Cape-marigold, DIMORPHOTHECA SP.
Cape-marigold, winter, DIMORPHOTHECA AURANTIACA
* 923. CAPNOIDES HALEI
* 924. CAPSICUM ANNUUM LONGUM, Chili pepper
* 925. CARDAMINE DEBILIS
926. CARICA CANDAMARCENSIS
927. CARYOPHYLLUS AROMATICUS (Eugenia caryophyllata)
928. CASIMIROA EDULIS, White-sapote
+* 929. CASSIA ARTEMISIOIDES, Wormwood senna
* 930. CASSIA FLORIBUNDA
931. CASSIA OCCIDENTALIS, Coffee senna
932. CASSINIA LEPTOPHYLLA
Castor-bean, common, RICINUS COMMUNIS
+* 933. CASUARINA LEPIDOPHLOIA
Catch-fly, small-flowered, SILENE GALLICA
934. CEDRELA ODORATA, Cigarbox-cedar
* 935. CEDRUS DEODARA, Deodar
* 936. CELOSIA ARGENTEA var., Feather coxcomb
937. CENTAUREA PALLESCENS
* 938. CENTAUREA SP., Centaurea
939. CEPHALOCEREUS SP.
Cereus carinosus - Grower's label; botanical identity uncertain
Cereus, nightblooming, HYLOCEREUS UNDATUS
(Chaetochloa verticillata) = SETARIA VERTICILLATA, Bur bristlegrass
(Chaetochloa viridis) = SETARIA VIRIDIS, Green bristlegrass

Chalice-vine, SOLANDRA GUTTATA
* To CHAYOTA EDULIS, Chayote, add *
* 940. CHENOPODIUM MURALE, Nettleleaf goosefoot
941. CHROZOPHORA ROTTLERI
+* To CHRYSANTHEMUM CINERARIAEFOLIUM add +*
\+ 942. CHRYSANTHEMUM COCCINEUM var. EILEEN MAY ROBINSON, Painted lady
* 943. CHRYSANTHEMUM CORONARIUM, Crowndaisy
944. CHRYSANTHEMUM HORTORUM var. QUEEN MARY
* 945. CHRYSANTHEMUM INDICUM, Mother chrysanthemum
+* To CHRYSANTHEMUM MAXIMUM add +* var. SHASTA DAISY
946. CHRYSANTHEMUM ROSEUM
(Chrysobactron hookeri) = BULBINELLA HOOKERI
+* CIENFUEGOSIA HAKEAEFOLIA (Alyogyne hakeaefolia) (A correction in synonymy made upon original host list of 1933)
Cigarbox-cedar, CEDRELA ODORATA
947. CINCHONA CALISAYA
948. CINCHONA JOSEPHIANA
949. CINCHONA SUCCIRUBRA
Cineraria, SENECIO CRUENTUS
Cineraria, silver, SENECIO CINERARIA
950. CITRUS SP.
* 951. CLARKIA SP., Clarkia
952. CLEMATIS ARMANDI, Armand clematis
953. CLEMATIS CHRYSOCARPA
954. CLEMATIS FARGESII
955. CLEMATIS FLAMMULA RUBRA MARGINATA
956. CLEMATIS INDIVISA LOBATA
957. CLEMATIS LANUGINOSA DURANDI
958. CLEMATIS LANUGINOSA LAWSONIANA
Clematis lasurstern grandiflora - Grower's label; botanical identity uncertain
959. CLEMATIS MACROPETALA
960. CLEMATIS MONTANA LILACINA
961. CLEMATIS MONTANA SUPERBA
962. CLEMATIS MONTANA UNDULATA
963. CLEMATIS MONTANA WILSONII
964. CLEMATIS QUINQUEFOLIATA
965. CLEMATIS STANS
966. CLEMATIS VENOSA
To CLEMATIS SP. add: 19 more vars. listed in U. S. Bur. Ent. & Plant Quar. News Letter of Oct. 1, 1934
967. CLEOME GYNANDRA, Small spider-flower
968. CLERODENDRON UGANDENSE
Clockvine, THUNBERGIA SP.
Clover, alsike, TRIFOLIUM HYBRIDUM
Clover, mammoth, TRIFOLIUM MEDIUM
Clover, strawberry, TRIFOLIUM RESUPINATUM
+* 969. COCCULUS CAROLINUS (?)

(Cochlearia armoracia) = RADICULA ARMORACIA, Horseradish
Cocklebur, XANTHIUM CANADENSE
970. COFFEA CANEPHORA SANKURUENSIS
971. COFFEA EXCELSA
972. COFFEA KWILUENSIS
973. COIX LACHRYMA-JOBI, Jobs-tears
974. COLEUS TUBEROSUS
975. COMMELINA NUDIFLORA, Creeping dayflower
* 976. COMMELINA SP., Dayflower
Conehead, Burma, STROBILANTHES DYERIANUS var.
977. CONVALLARIA MAJALIS, Lily-of-the-valley
978. CONVOLVULUS ARVENSIS, Bindweed
+* 979. CONVOLVULUS JAPONICUS, Rose convolvulus
(Convolvulus limatus) (Probably typographical error for C. LINEATUS)
980. CONVOLVULUS LINEATUS
981. CORCHORUS SP., Jute
* 982. COREOPSIS TINCTORIA, Calliopsis
* 983. COREOPSIS SP., Coreopsis
To CORYLUS AVELLANA add vars. KENT COBB, RED SKINNED, COSFORD, and MERVEILLE DE BOLLWYLLER
(Corypha australis) = LIVISTONA AUSTRALIS
+* 984. COSMOS SULPHUREUS, Yellow cosmos
* 985. COSMOS SP., Cosmos
Cotton weed, FROELICHIA FLORIDANA
986. COTYLEDON CACALIOIDES
Cotyledon coronata - Grower's label; botanical identity uncertain
987. COTYLEDON WALLICHII
Coxcomb, feather, CELOSIA ARGENTEA var.
Crab-grass, DIGITARIA PRURIENS, DIGITARIA SANGUINALIS
Crab-grass, Chinese, DIGITARIA CHINENSIS
988. CRASSULA COTYLEDONIS
989. CRASSULA LYCOPODIOIDES
990. CRASSULA SP.
Cress, lake, RADICULA AQUATICA
991. CROTALARIA SALTIANA, Rattle-pod
* 992. CROTALARIA STRIATA
Crowndaisy, CHRYSANTHEMUM CORONARIUM
993. CUCURBITA OVIFERA (Cucurbita pepo var. ovifera), Gourd
(Cucurbita pepo var. ovifera) = CUCURBITA OVIFERA, Gourd
Cudweed, GNAPHALIUM SPATHULATUM
+* 994. CUPHEA PLATYCENTRA
Cyclamen hederaefolium - Grower's label; botanical identity uncertain
995. CYCLAMEN NEAPOLITANUM, Neapolitan cyclamen
* 996. CYDONIA SP., Quince
* 997. CYNARA SCOLYMUS, Artichoke
* 998. CYNOGLOSSUM SP., Houndstongue

* 999. CYPERUS ALTERNIFOLIUS, Umbrella-sedge
+* 1000. CYPERUS COMPRESSES
+* 1001. CYPERUS ROTUNDUS, Nutgrass
* 1002. CYPERUS STRIGOSUS
To DAHLIA SP. add * vars. (41 listed by Schmidt: Pl. Dis. Rptr. 21: 32-33 1937)
Daisy, Shasta, CHRYSANTHEMUM MAXIMUM var. SHASTA DAISY
* 1003. DATURA STRAMONIUM, Jimsonweed
Dayflower, COMMELINA SP.
Dayflower, creeping, COMMELINA NUDIFLORA
Daylily, HEMEROCALLIS SP. var. AUREOLE
Deadnettle, LAMIUM SP.
+* 1004. DELPHINIUM ELATUM hybrid
Deodar, CEDRUS DEODARA
(Desmodium triflorum) = MEIBOMIA TRIFLORA, Three-flowered beggar-weed
To DIERVILLA SP. add: vars. FEEAY and IDEAL
1005. DIGITARIA CHINENSIS (Syntherisma chinensis), Chinese crab-grass
+* 1006. DIGITARIA ISCHAEMUM
1007. DIGITARIA PRURIENS (Syntherisma pruriens), Crab-grass
+* 1008. DIGITARIA SANGUINALIS (Syntherisma sanguinalis), Crab-grass
* 1009. DIMORPHOTHECA AURANTIACA, Winter cape-marigold
1010. DIMORPHOTHECA SP., Cape-marigold
(Diodella teres) = DIODIA TERES, Buttonweed
* 1011. DIODIA TERES (Diodella teres), Buttonweed
1012. DIOSCOREA ALATA, Winged yam
1013. DIOSPYROS SP., Persimmon
1014. DIPLOTAXIS SP.
* 1015. DOLICHOS SP., Dolichos
+* 1016. DORONICUM SP., Leopardbane
Also var. MISS MASON
* 1017. DRACAENA FRAGRANS var. MASSANGE
+* 1018. DRACAENA SP. var. LORD WOLSELEY
* Also var. TERMINALIS
\+ 1019. DRIMIA HAWORTHIOIDES
Dunegrass, American, ELYMUS MOLLIS
1020. ECHEVERIA PRINGLEI
1021. ECHEVERIA RETUSA
\+ 1022. ECHEVERIA SP., Echeveria
1023. ECHINOCACTUS HASELBERGII
Echinocactus lennin - Grower's label; botanical identity uncertain
1024. ECHINOCACTUS MIHANOVICHII
1025. ECHINOCACTUS QUEHLIANUS
1026. ECHINOCACTUS SCHUMANNIANUS
+* 1027. ECHINOCHLOA COLONUM, Jungle-rice
1028. ECHINOPSIS SP.
* ECLIPTA ALBA (Verbesina alba)

1029. ELAEIS GUINEENSIS, African oil palm
Elder, European, SAMBUCUS NIGRA
Elm, ULMUS SP.
+* 1030. ELYMUS MOLLIS, American dunegrass
1031. EMILIA SONCHIFOLIA, Tasselflower
* 1032. ENCELIA CALIFORNICA
1033. EPILOBIUM TETRAGONUM
+* 1034. EPILOBIUM SP., Willow-weed
Epimedium sulphureum - Grower's label; botanical identity uncertain
1035. EPIPHYLLUM SP.
1036. ERAGROSTIS DIFFUSA
+* ERECHTITES HIERACIFOLIA (Senecio hieracifolia), Fireweed
* 1037. ERIOBOTRYA JAPONICA, Loquat
+* 1038. ERIOPHYLLUM LANATUM
+* 1039. ERODIUM CICUTARIUM, Alfileria
(Eugenia caryophyllata) = CARYOPHYLLUS AROMATICUS
* 1040. EUPATORIUM SEROTINUM, Late thoroughwort
1041. EUPHORBIA CANARIENSIS
Euphorbia clambertina - Grower's label; botanical identity uncertain
1042. EUPHORBIA CLANDESTINA
1043. EUPHORBIA CRASSIPES
1044. EUPHORBIA ESCULENTA
1045. EUPHORBIA FEROX
1046. EUPHORBIA FILIFLORA
1047. EUPHORBIA GORGONIS
1048. EUPHORBIA HEPTAGONA
1049. EUPHORBIA MELOFORMIS
1050. EUPHORBIA MICRACANTHA
1051. EUPHORBIA MUIRII
1052. EUPHORBIA MULTICEPS
1053. EUPHORBIA NERIIFOLIA
1054. EUPHORBIA OBESA
1055. EUPHORBIA PENTAGONA
1056. EUPHORBIA PRESLII, Nodding spurge
1057. EUPHORBIA PSEUDOGLOBOSA
1058. EUPHORBIA PUGNIFORMIS
+ 1059. EUPHORBIA PUNCTATA
1060. EUPHORBIA SQUARROSA
1061. EUPHORBIA STELLAESPINA
1062. EUPHORBIA STELLATA
1063. EUPHORBIA SUSANNAE
1064. EUPHORBIA TRIDENTATA
1065. EUPHORBIA TRUNCATA
Everlasting, HELICHRYSUM SP.
Everlasting, rose, HELIPTERUM ROSEUM
1066. EXACUM ZEYLANICUM

(Fagopyrum esculentum) = FAGOPYRUM VULGARE, Common buckwheat
* FAGOPYRUM VULGARE (Fagopyrum esculentum), Common buckwheat
False-camomile, MATRICARIA SP.
False Jerusalem-cherry, SOLANUM CAPSICASTRUM
False-vervain, STACHYTARPHETA DICHOTOMA
1067. FATSIA JAPONICA, Fatsia
+* To FICUS CARICA, Common fig, add +* Hyb. X with F. PSEUDOCARICA
* 1068. FICUS MACROPHYLLA, Moreton Bay fig
+* 1069. FICUS PALMATA
* 1070. FICUS PUMILA (Ficus repens), Climbing fig
(Ficus repens) = FICUS PUMILA, Climbing fig
+* 1071. FICUS RUBIGINOSA, Rusty fig
Fig, climbing, FICUS PUMILA
Fig, Moreton Bay, FICUS MACROPHYLLA
Fig, rusty, FICUS RUBIGINOSA
Fireweed, ERECHTITES HIERACIFOLIA
Flax, golden, LINUM FLAVUM
Flax, perennial, LINUM PERENNE
Four-o'clock, common, MIRABILIS JALAPA
1072. FRAGARIA GRANDIFLORA, Strawberry
* 1073. FROELICHIA FLORIDANA, Cotton weed
1074. FUCHSIA EXCORTICATA
\+ 1075. FUNTUMIA ELASTICA
+* 1076. FURCRAEA GIGANTEA
Garlic, ALLIUM SATIVUM
Gayfeather, LIATRIS SP.
Gayfeather, spike, LIATRIS SPICATA
1077. GENISTA SP., Broom
1078. GENTIANA ACAULIS, Stemless gentian
1079. GERANIUM CINEREUM
Geranium, PELARGONIUM SP.
Geranium, fish, PELARGONIUM HORTORUM
1080. GEUM HYBRIDUM
* 1081. GEUM SP., Avens
* 1082. GILIA SP., Gilia
Gingerlily, common, HEDYCHIUM CORONARIUM
+* 1083. GINKGO BILOBA, Maidenhair-tree
Globe-amaranth, common, GOMPHRENA GLOBOSA
Gloxinia, common, SINNINGA SPECIOSA
* 1084. GNAPHALIUM SPATHULATUM, Cudweed
* 1085. GODETIA SP., Godetia
Goldencup, HUNNEMANNIA FUMARIAEFOLIA
Goldflower, HYPERICUM MOSERIANUM
1086. GOMPHOCARPUS FRUTICOSUS
1087. GOMPHOCARPUS PHYSOCARPUS
* 1088. GOMPHRENA GLOBOSA, Common globe-amaranth
Goosefoot, nettleleaf, CHENOPODIUM MURALE
Gourd, CUCURBITA OVIFERA
Grape, Bourquin, hort. var. and hybrid vars., VITIS AESTIVALIS BOURQUINIANA

Grape, California, var., VITIS CALIFORNICA
Grape, canyon, var., VITIS ARIZONICA
Grape, Doan, var., VITIS DOANIANA
Grape, Longs, hort. var. and hybrid vars., VITIS LONGII
Grape, pinewoods, VITIS LINSECOMI var.
Grape, riverbank, var., VITIS VULPINA
Grape, sand, hort. var. and hybrid vars., VITIS RUPESTRIS
Grape, winter, hort. var. and hybrid vars., VITIS BERLANDIERI

1089. GRAPHALIUM LUTEO-ALBUM
Grass, Napier, PENNISETUM PURPUREUM
Grass, Natal, TRICHOLAENA ROSEA
1090. GREVILLEA ROBUSTA, Silk-oak
1091. GYNANDROPSIS SPECIOSA
* 1092. GYPSOPHILA SP., Gypsophila
Haworthia blackbeardii? - Grower's label; botanical identity uncertain
1093. HAWORTHIA FASCIATA
1094. HAWORTHIA SUBFASCIATA
1095. HEDERA SP., Ivy
1096. HEDYCHIUM CORONARIUM, Common gingerlily
1097. HELENIUM AUTUMNALE (Helenium pumilum)
(Helenium pumilum) = HELENIUM AUTUMNALE
* 1098. HELIANTHUS SP., Sunflower
1099. HELICHRYSUM SP., Everlasting
* 1100. HELIPTERUM ROSEUM, Rose everlasting
+* 1101. HEMEROCALLIS SP. var. AUREOLE, Daylily
1102. HEPATICA TRILOBA var.
1103. HEVEA BRASILIENSIS, Para rubbertree
1104. HIBBERTIA DENTATA
+* HIBISCUS ESCULENTUS (Abelmoschus esculentus), Okra
Hollygrape, Oregon, BERBERIS AQUIFOLIUM
* To HORDEUM VULGARE, Barley add *
Houndstongue, CYNOGLOSSUM SP.
1105. HOYA BELLA
* 1106. HUNNEMANNIA FUMARIAEFOLIA, Goldencup
1107. HYDRANGEA OPULOIDES, House hydrangea
1108. HYDROCOTYLE ASIATICA, Asiatic pennywort
+* 1109. HYDROCOTYLE ROTUNDIFOLIA
* 1110. HYDROCOTYLE SP., Pennywort
+* 1111. HYLOCEREUS UNDATUS, Nightblooming cereus
* 1112. HYPERICUM MOSERIANUM, Goldflower
+* To HYPERICUM PERFORATUM add +*
* 1113. HYPTIS PECTINATA
+* 1114. HYSSOPUS OFFICINALIS, Hyssop
Ilima, SIDA MEYENIANA
+* To IMPATIENS BALSAMINA, Garden balsam, add +*
1115. INDIGOFERA ENDECAPHYLLA
1116. IPOMOEA PES-CAPRAE
1117. IPOMOEA TUBERCULATA, Five-fingered morning-glory

1118. IPOMOEA TURPETHUM
+* 1119. IRESINE HERBSTI
+* 1120. IRESINE LINDENI, Linden bloodleaf
+ 1121. IRIS LAEVIGATA var. YAMATO NISHIKI
* To IRIS SP. add *
Ivy, HEDERA SP.
Jackfruit, ARTOCARPUS INTEGRA
Jasmine, JASMINUM SP.
Jasminum stephanense - Grower's label; botanical identity uncertain
Jasminum veneris grandiflora - Grower's label; botanical identity uncertain
1122. JASMINUM SP., Jasmine
Jerusalem-cherry, false, SOLANUM CAPSICASTRUM
Jimsonweed, DATURA STRAMONIUM
Jobs-tears, COIX LACHRYMA-JOBI
1123. JUGLANS SP., Walnut
Jungle-rice, ECHINOCHLOA COLONUM
Jute, CORCHORUS SP.
+ 1124. KALANCHOE SP., Kalanchoe
Kiabe, PROSOPIS CHILENSIS
* 1125. KNIPHOFIA UVARIA, Common torchlily
1126. KYLLINGA MONOCEPHALA
Laceflower, blue, TRACHYMENE CAERULEA
1127. LACTUCA DRACOGLOSSA
+* 1128. LACTUCA SCARIOLA
+* 1129. LACTUCA SCARIOLA INTEGRATA
+ 1130. LAMIUM ORVALA ALBA
1131. LAMIUM SP., Deadnettle
* 1132. LANTANA CAMARA, Common lantana
1133. LATANIA BORBONICA, Latania
* 1134. LATHYRUS LATIFOLIUS, Perennial pea
+* To LAVANDULA SPICA, True lavender, add +*
Lebbek, ALBIZZIA LEBBEK
Leopardbane, DORONICUM SP.
+* 1135. LESPEDEZA SERICEA
* 1136. LIATRIS SPICATA, Spike gayfeather
+* 1137. LIATRIS SP., Gayfeather
* 1138. LIGUSTRUM JAPONICUM, Japanese privet
* 1139. LIGUSTRUM NEPALENSE, Nepal privet
* 1140. LIGUSTRUM OVALIFOLIUM VARIEGATUM, Golden California privet
1141. LIGUSTRUM VULGARE, European privet
Lilac, Chengtu, SYRINGA SWEGINZOWII
* 1142. LILIUM LONGIFLORUM, Easter lily
Lily, Easter, LILIUM LONGIFLORUM
Lily-of-the-valley, CONVALLARIA MAJALIS
* 1143. LIMONIUM SINUATUM, Notchleaf sea-lavender
* 1144. LINARIA FLORIDANA, Toadflax
* 1145. LINARIA SP., Toadflax

1146. LINDERA PRAECOX
1147. LINDERNIA VISCOSA
* 1148. LINUM FLAVUM, Golden flax
1149. LINUM PERENNE, Perennial flax
1150. LIPPIA SP., Lippia
1151. LIVISTONA AUSTRALIS (Corypha australis)
Lizardtail, common, SAURURUS CERNUUS
* 1152. LOBELIA SP., Lobelia
Lobivia graulichi - Grower's label; botanical identity uncertain
Lobivia schuldti - Grower's label; botanical identity uncertain
Locust, black, ROBINIA PSEUDOACACIA
Locust, common, ROBINIA PSEUDOACACIA
* 1153. LONICERA NITIDA
Loquat, ERIOBOTRYA JAPONICA
To LUFFA SP. add common name Sponge-gourd
Lupine, South American, LUPINUS MUTABILIS
1154. LUPINUS MUTABILIS, South American lupine
+* To LUPINUS SP., Lupine, add +*
Maidenhair-tree, GINKGO BILOBA
Mallow, MALVA SP.
+* 1155. MALVA ROTUNDIFOLIA (?)
1156. MALVA SP., Mallow
1157. MAMMILLARIA TRICHACANTHA
1158. MAMMILLARIA SP. (Neomammillaria sp.)
Manila hemp, MUSA TEXTILIS
Marigold, Aztec, TAGETES ERECTA
Marigold, French, TAGETES PATULA
Marigold, striped, TAGETES SIGNATA
Marigold, sweet, TAGETES LUCIDA
1159. MARISCUS TENUIFOLIUS
* 1160. MATRICARIA SP., False-camomile
* To MATTHIOLA SP., Stock, add *
Mazzard, PRUNUS AVIUM
Meadowrue, THALICTRUM SP.
* 1161. MEDICAGO HISPIDA, Burclover
1162. MEIBOMIA TRIFLORA (Desmodium triflorum), Three-flowered beggarweed
* 1163. MELIA AZEDARACH UMBRACULIFERA (M. azedarach umbraculiformis), Texas umbrella-tree
* 1164. MELILOTUS ALBA ANNUA, Hubam sweetclover
+* 1165. MELILOTUS SP.
+* 1166. MENTHA ARVENSIS PIPERASCENS, Japanese mint
+* 1167. MENTHA PIPERITA, Peppermint
Mesquite, PROSOPIS CHILENSIS
Mexican-clover, RICHARDIA BRASILIENSIS, RICHARDIA SCABRA
Michaelmas-daisy, ASTER TRADESCANTI
1168. MIMOSA INVISA
Mint, Japanese, MENTHA ARVENSIS PIPERASCENS

* 1169. MIRABILIS JALAPA, Common four-o'clock
Monkshood, ACONITUM SP.
Moonflower, CALONYCTION SP., C. ACULEATUM
* 1170. MORMORDICA SP. (publ. with common name "gherkins")
Morning-glory, five-fingered, IPOMOEA TUBERCULATA
Moss-rose, wild, PORTULACA PILOSA
(Mullungo) see MOLLUGO in host list of 1933
1171. MUSA PARADISIACA
1172. MUSA PARADISIACA CHAMPA, Ladyfinger banana
* To MUSA TEXTILIS add common names Abaca, Manila hemp
Mustard, tansy, SOPHIA PINNATA
Myrtle, true, MYRTUS COMMUNIS
1173. MYRTUS COMMUNIS, True myrtle
Nasturtium, TROPAEOLUM SP.
Nectarine, AMYGDALUS PERSICA NECTARINA
(Neobeckia aquatica) = RADICULA AQUATICA, Lake cress
(Neomammillaria sp.) = MAMMILLARIA SP.
* 1174. NICOTIANA ALATA, Winged tobacco
* 1175. NICOTIANA GLAUCA, Tree tobacco
1176. NICOTIANA SP., Tobacco, Nicotiana
Nightshade, SOLANUM DOUGLASII, SOLANUM GRACILE, SOLANUM SP.
Nightshade, purple, SOLANUM XANTI
Nutgrass, CYPERUS ROTUNDUS
Oak, California live, QUERCUS AGRIFOLIA
Oat, wild, AVENA FATUA
* 1177. OCIMUM SP., Basil
1178. ODONTONEMA RUTILANS
1179. OENOTHERA SPECIOSA ROSEA
Oil palm, African, ELAEIS GUINEENSIS
\+ 1180. ORNITHOGALUM SAUNDERSIAE var. "MRS. SAUNDERS'S"
\+ 1181. ORNITHOGALUM THYRSOIDES
\+ 1182. OSMANTHUS AQUIFOLIUM, Holly osmanthus
* 1183. OXALIS SP. probably O. CORNICULATA (Xanthoxalis sp. probably X. corniculata), Creeping oxalis
Pachyphytum virense - Grower's label; botanical identity uncertain
\+ 1184. PACHYRRHIZUS EROSUS
* 1185. PACHYSANDRA TERMINALIS, Japanese pachysandra
1186. PAEDERIA FOETIDA
1187. PAEONIA ALBIFLORA, Chinese peony
(Paeonia 'arborea') = PAEONIA SUFFRUTICOSA, Tree peony
1188. PAEONIA OFFICINALIS, Common peony
1189. PAEONIA SUFFRUTICOSA (Paeonia 'arborea'), Tree peony
Painted lady, CHRYSANTHEMUM COCCINEUM var. EILEEN MAY ROBINSON
Palm, African oil, ELAEIS GUINEENSIS
Palm, Washington, WASHINGTONIA SP.
1190. PAPAVER SOMNIFERUM, Opium poppy
* 1191. PAPAVER SP., Poppy
1192. PASPALUM LARRANAGAI

1193. PASPALUM SP.
Pea, Austrian winter field, var. of PISUM ARVENSE
Pea, perennial, LATHYRUS LATIFOLIUS
+* 1194. PELARGONIUM HORTORUM, Fish geranium
1195. PELARGONIUM SP., Pelargonium, Geranium
1196. PENNISETUM PURPUREUM, Napier grass
Pennywort, HYDROCOTYLE SP.
Pennywort, Asiatic, HYDROCOTYLE ASIATICA
1197. PENTSTEMON WRIGHTII
* 1198. PENTSTEMON SP., Pentstemon
Peony, Chinese, PAEONIA ALBIFLORA
Peony, common, PAEONIA OFFICINALIS
Peony, tree, PAEONIA SUFFRUTICOSA
1199. PEPEROMIA PELLUCIDA
Pepino, SOLANUM MURICATUM
Pepper, Chili, CAPSICUM ANNUUM LONGUM
Peppermint, MENTHA PIPERITA
Peppertree, SCHINUS SP.
+* 1200. PERISTROPHE ANGUSTIFOLIA
Periwinkle, bigleaf, VINCA MAJOR
Periwinkle, common, VINCA MINOR
Persimmon, DIOSPYROS SP.
To PHASEOLUS VULGARIS add var. RODRIQUEZ
+* 1201. PHLOX DRUMMONDII, Drummond phlox
* 1202. PHLOX DRUMMONDII STELLARIS, Star phlox
* 1203. PHLOX NANA COMPACTA, Dwarf phlox
Phlox septemberschnee - Grower's label; botanical identity uncertain
To PHLOX SP. add var. HADUPERT
* 1204. PHYSALIS EDULIS, Cape-gooseberry
+* 1205. PHYSALIS IXOCARPA, Tomatillo
To PHYSALIS SP., Groundcherry, add another common name, Cape-gooseberry
1206. PHYTOLACCA ACINOSA
* 1207. PHYTOLACCA RIGIDA, Pokeberry
(Picridium tingitanum) = REICHARDIA TINGITANA
Pigweed, AMARANTHUS GRACILIS
Pimpernel, red, ANAGALLIS ARVENSIS
Pimpernel, water, SAMOLUS FLORIBUNDUS
Pine, longleaf, PINUS PALUSTRIS
Pine, slash, PINUS CARIBAEA
+* 1208. PINUS CARIBAEA, Slash pine
+* 1209. PINUS PALUSTRIS, Longleaf pine
+* To PISUM ARVENSE add +* var. Austrian winter field pea
+* 1210. PITTOSPORUM TOBIRA, Tobira
+* To PLANTAGO LANCEOLATA, Buckhorn plantain, add +*
Pokeberry, PHYTOLACCA RIGIDA
Polygala oleifera, - Botanical identity uncertain
Pomegranate, PUNICA SP.

Pomegranate, dwarf, PUNICA GRANATUM NANA
Poplar, POPULUS SP.
Popolo, SOLANUM NODIFLORUM
Popolo, thorny, SOLANUM ACULEATISSIMUM
Poppy, PAPAVER SP.
Poppy, opium, PAPAVER SOMNIFERUM

1211. POPULUS SP., Poplar
* 1212. PORTULACA PILOSA, Wild moss-rose
* 1213. PORTULACA SP., Portulaca
1214. PRIMULA PUBESCENS var. RUBY
1215. PRIMULA REINII

Privet, European, LIGUSTRUM VULGARE
Privet, golden California, LIGUSTRUM OVALIFOLIUM VARIEGATUM
Privet, Japanese, LIGUSTRUM JAPONICUM
Privet, Nepal, LIGUSTRUM NEPALENSE

1216. PROSOPIS CHILENSIS (Prosopis juliflora), Mesquite, Algaroba, Kiabe

(Prosopis juliflora) = PROSOPIS CHILENSIS, Mesquite, Algaroba, Kiabe

1217. PROSTANTHERA ROTUNDIFOLIA
1218. PRUNELLA VULGARIS, Selfheal
1219. PRUNUS AVIUM, Mazzard
1220. PSOPHOCARPUS TETRAGONOLOBUS
1221. PTERODISCUS LURIDUS

Puncturevine, TRIBULUS TERRESTRIS

* 1222. PUNICA GRANATUM NANA (Punica sempervirens), Dwarf pomegranate

(Punica sempervirens) = PUNICA GRANATUM NANA, Dwarf pomegranate

* 1223. PUNICA SP., Pomegranate
* To PYRUS COMMUNIS, Common pear, add *
* 1224. QUAMOCLIT SLOTERI
* 1225. QUERCUS AGRIFOLIA, California live oak
* To QUERCUS SUBER, Cork oak, add *

Quince, CYDONIA SP.

* 1226. RADICULA AQUATICA (Neobeckia aquatica), Lake cress
* RADICULA ARMORACIA (Cochlearia armoracia), Horseradish

To RAPHANUS SATIVUS add vars. ESCULENTUS and RADICULA

Rattle-pod, CROTALARIA SALTIANA
Rehmannia africana - Grower's label; botanical identity uncertain
Rehmannia bergi - Grower's label; botanical identity uncertain

1227. REICHARDIA TINGITANA (Picridium tingitanum)
+ 1228. RHAPHITHAMNUS CYANOCARPUS
* 1229. RICHARDIA BRASILIENSIS, Mexican-clover.
* 1230. RICHARDIA SCABRA (Richardsonia scabra), Mexican-clover

(Richardsonia scabra) = RICHARDIA SCABRA, Mexican-clover

1231. RICINUS COMMUNIS, Common castor-bean
+* 1232. ROBINIA PSEUDOACACIA, Common locust, Black locust

Rochea longifolia - Grower's label; botanical identity uncertain.

1233. ROSA INDICA
+* 1234. ROSA ODORATA, Tea rose
Rose, tea, ROSA ODORATA
Rosemary, ROSMARINUS SP., ROSMARINUS OFFICINALIS
1235. ROSMARINUS SP., Rosemary
+* 1236. ROUBIEVA MULTIFIDA (?)
Rubbertree, Para, HEVEA BRASILIENSIS
Rue, common, RUTA GRAVEOLENS
+* 1237. RUMEX ACETOSELLA
* 1238. RUMEX HYMENOSEPALUS, Canaigre
1239. RUTA GRAVEOLENS, Common rue
Sage, mealycup, SALVIA FARINACEA
Sage, Mexican bush, SALVIA LEUCANTHA
1240. SALPIGLOSSIS SP., Salpiglossis
* 1241. SALVIA FARINACEA, Mealycup sage
* 1242. SALVIA LEUCANTHA, Mexican bush sage
1243. SAMBUCUS NIGRA, European elder
* 1244. SAMOLUS FLORIBUNDUS, Water pimpernel
+* 1245. SANSEVIERIA ZEYLANICA var. LAURENTII
* 1246. SAURURUS CERNUUS, Common lizardtail
1247. SCHINUS SP., Peppertree
* 1248. SCHIZANTHUS SP., Butterflyflower
1249. SCOPARIA DULCIS
Sea-lavender, notchleaf, LIMONIUM SINUATUM
+* 1250. SEDUM SARMENTOSUM
* 1251. SEDUM SPECTABILE, Showy stonecrop
Selfheal, PRUNELLA VULGARIS
+* 1252. SENECIO CINERARIA, Silver cineraria
+* 1253. SENECIO CRUENTUS, Cineraria
(Senecio hieracifolia) = ERECHTITES HIERACIFOLIA, Fireweed
Senna, coffee, CASSIA OCCIDENTALIS
Senna, wormwood, CASSIA ARTEMISIOIDES
1254. SESAMUM INDICUM
1255. SETARIA VERTICILLATA (Chaetochloa verticillata), Bur bristlegrass
+* 1256. SETARIA VIRIDIS (Chaetochloa viridis), Green bristlegrass
1257. SIDA MEYENIANA, Ilima
1258. SILENE GALLICA, Small-flowered catch-fly
Silk-oak, GREVILLEA ROBUSTA
1259. SINNINGA SPECIOSA, Common gloxinia
Snapdragon, ANTIRRHINUM SP. Hort. var.
Snapdragon, chaparral, ANTIRRHINUM COULTERIANUM
1260. SOLANDRA GUTTATA, Chalice-vine
1261. SOLANUM ACULEATISSIMUM, Thorny popolo
1262. SOLANUM AURICULATUM
+* 1263. SOLANUM CAPSICASTRUM, False Jerusalem-cherry
* 1264. SOLANUM DOUGLASII, Nightshade
* 1265. SOLANUM GRACILE, Nightshade
1266. SOLANUM MURICATUM, Pepino

1267. SOLANUM NODIFLORUM, Popolo
+* 1268. SOLANUM VILLOSUM
* 1269. SOLANUM XANTI, Purple nightshade
* 1270. SOPHIA PINNATA, Tansy mustard
+* 1271. SOPHIA SP.
Spathoglottis parsoni - Grower's label; botanical identity uncertain
Spider-flower, small, CLEOME GYNANDRA
Spiderwort, TRADESCANTIA SP.
* 1272. SPIRAEA SP. vars. ANTHONY WATERER and VANHOUTTE
(Sponge-gourd), LUFFA SP.
Spurge, nodding, EUPHORBIA PRESLII
1273. STACHYS ARVENSIS, Field betony
1274. STACHYTARPHETA DICHOTOMA, False-vervain
1275. STAPELIA SP.
Sticktight, BIDENS PILOSA
Stonecrop, showy, SEDUM SPECTABILE
Strawberry, FRAGARIA GRANDIFLORA, FRAGARIA SP.
1276. STROBILANTHES DYERIANUS var., Burma conehead
1277. STYRAX DASYANTHA
1278. STYRAX VEITCHIORUM
Sunflower, HELIANTHUS SP.
Sweetclover, hubam, MELILOTUS ALBA ANNUA
1279. SYNEDRELLA NODIFLORA
(Syntherisma chinensis) = DIGITARIA CHINENSIS, Chinese crab-grass
(Syntherisma pruriens) = DIGITARIA PRURIENS, Crab-grass
(Syntherisma sanguinalis) = DIGITARIA SANGUINALIS, Crab-grass
1280. SYRINGA SWEGINZOWII, Chengtu lilac
+* 1281. TAGETES ERECTA, Aztec marigold
Also Hort. vars.
+* 1282. TAGETES LUCIDA, Sweet marigold
+* 1283. TAGETES PATULA, French marigold
Also Hort. vars.
+* 1284. TAGETES SIGNATA, Striped marigold
Tasselflower, EMILIA SONCHIFOLIA
1285. TEPHROSIA CANDIDA
1286. THALICTRUM SP., Meadowrue
THEA SINENSIS (Camellia thea; Camellia theifera), Tea
1287. THEOBROMA PENTAGONA
1288. THEOBROMA SPHAEROCARPA
Thoroughwort, late, EUPATORIUM SEROTINUM
* 1289. THUNBERGIA SP., Clockvine
1290. THYMUS AZORICUS
1291. TITHONIA DIVERSIFOLIA
1292. TITHONIA ROTUNDIFOLIA, Tall tithonia
Toadflax, LINARIA FLORIDANA, LINARIA SP.
Tobacco, NICOTIANA SP.
Tobacco, tree, NICOTIANA GLAUCA

Tobacco, winged, NICOTIANA ALATA
Tobira, PITTOSPORUM TOBIRA
Tomatillo, PHYSALIS IXOCARPA
Torchlily, common, KNIPHOFIA UVARIA

+* 1293. TORENIA FOURNIERI, Blue torenia
* 1294. TORENIA SP., Torenia
* 1295. TRACHYMENE CAERULEA, Blue laceflower
+* 1296. TRADESCANTIA DRACAENOIDES
1297. TRADESCANTIA SP., Spiderwort
+* 1298. TRIBULUS TERRESTRIS, Puncturevine
* 1299. TRICHOLAENA ROSEA, Natal grass
+* TRIFOLIUM FRAGIFERUM (Common name, strawberry clover, removed and applied to T. RESUPINATUM)
+* 1300. TRIFOLIUM HYBRIDUM, Alsike clover
+* 1301. TRIFOLIUM MEDIUM, Mammoth clover
+* 1302. TRIFOLIUM MICHELIANUM
+* 1303. TRIFOLIUM RESUPINATUM, Strawberry clover
+* To TRIFOLIUM SP. add +*
* 1304. TROPAEOLUM SP., Nasturtium
1305. ULMUS SP., Elm
Umbrella-sedge, CYPERUS ALTERNIFOLIUS
Umbrella-tree, Texas, MELIA AZEDARACH UMBRACULIFERA
1306. URBINIA PURPUSII
To URENA LOBATA add var. RETICULATA
1307. VERBENA BONARIENSIS
Verbena luminosa - Grower's label; botanical identity uncertain
* 1308. VERBENA SCABRA, Vervain
* To VERBENA SP. add *
(Verbesina alba) = ECLIPTA ALBA
1309. VERNONIA CINEREA
1310. VERONICA LONGIFOLIA MARITIMA
Vervain, VERBENA SCABRA
Vetch, VICIA SP.
1311. VIBURNUM CARLESII, Fragrant viburnum
1312. VIBURNUM FRAGRANS
* 1313. VIBURNUM SUSPENSUM, Sandankwa viburnum
1314. VIBURNUM SP., Viburnum
+* 1315. VICIA SP., Vetch
1316. VIGNA SESQUIPEDALIS, Asparagus-bean
* 1317. VINCA MAJOR, Bigleaf periwinkle
1318. VINCA MINOR, Common periwinkle
1319. VINCA MINOR ALBA
* 1320. VIOLA PEDUNCULATA, Yellow pansy violet
* To VIOLA SP. add: * vars. BELLE DE CHATENAY, MOONLIGHT, and REINE DE BLANCHES
Violet, yellow pansy, VIOLA PEDUNCULATA
* 1321. VITIS AESTIVALIS BOURQUINIANA Hort. var. and hybrid vars. (Vitis bourquiniana), Bourquin grape

* 1322. VITIS ARIZONICA var., Canyon grape
* 1323. VITIS BERLANDIERI Hort. var. and hybrid vars., Winter grape
(Vitis bourquiniana) = VITIS AESTIVALIS BOURQUINIANA Hort. var. and hybrid vars., Bourquin grape
* 1324. VITIS CALIFORNICA var., California grape
* 1325. VITIS DOANIANA var., Doan grape
* 1326. VITIS LINSECOMI (Vitis lincecumii) var., Pinewoods grape
* 1327. VITIS LONGII Hort. var. and hybrid vars., Longs grape
* 1328. VITIS RUPESTRIS Hort. var. and hybrid vars., Sand grape
* To VITIS VINIFERA add: * 154 vars. publ. by E. Snyder in U.S.D.A. Circ. #405, 1936
* 1329. VITIS VULPINA var., Riverbank grape
Walnut, JUGLANS SP.
Washington palm, WASHINGTONIA SP.
1330. WASHINGTONIA SP., Washington palm
Wattle, cootamundra, ACACIA BAILEYANA
Wattle, gossamer, ACACIA LONGIFOLIA FLORIBUNDA
White-sapote, CASIMIROA EDULIS
Willow-weed, EPILOBIUM SP.
1331. XANTHIUM CANADENSE, Cocklebur
(Xanthoxalis sp. probably X. corniculata) = OXALIS SP. probably OXALIS CORNICULATA, Creeping oxalis
Yam, winged, DIOSCOREA ALATA
1332. ZINNIA SP., Zinnia

RELATIVE PREVALENCE AND GEOGRAPHICAL DISTRIBUTION OF VARIOUS EAR ROT FUNGI IN THE 1937 CORN CROP [1]

P. E. Hoppe[2]

Herein are summarized the results of the fifth annual survey of the relative prevalence of various ear rot fungi in the 1937 corn crop. The results from the four preceding crops have been previously reported (P.D.R. 18: 186-189, 20: 26-30, 20: 312-316, and 21: 222-224). The methods employed in these surveys are briefly reviewed. Samples containing the sound and the damaged separates from carload lots of corn of known origin are sent by grain inspectors, located at terminal markets,

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[1] Survey conducted by the Federal Grain Supervision Service, Bureau of Agricultural Economics, U. S. Department of Agriculture, the Wisconsin Agricultural Experiment Station, and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture.

[2] Associate Pathologist, Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture.

Table 1. Average percentages, by states and regions, of fungi recovered in plating damaged kernels from samples obtained from carload lots of corn arriving at terminal markets (1937 crop).

Origin of samples	Number carloads sampled	Sound kernels	Diplodia zeae	D. macrospora	Gibberella saubinetii	Fusarium moniliforme	Other fusaria	Nigrospora sphaerica	Mucors	Penicillium spp.	Aspergillus spp.	An unidentified fungus	Sterile kernels	Miscellaneous
Atlantic Seaboard States														
Maryland	21	0.9	29.1	0	8.1	31.6	0.5	0.4	2.0	3.2	0	9.1	0.8	14.3
Delaware	4	1.5	33.4	0	10.2	20.4	1.1	0.5	3.9	3.3	0	6.2	2.2	17.3
Pennsylvania	1	5.4	48.7	0	16.2	18.9	0	0	2.7	2.7	0	0	0	5.4
Average	26	1.2	30.5	0	8.7	29.4	0.6	0.4	2.3	3.2	0	8.3	1.0	14.4
Southern States														
Kentucky	11	0	15.7	0	5.4	61.4	1.8	0.2	2.9	4.8	0	1.3	0.7	5.8
Tennessee	10	0.2	24.0	0.4	3.7	64.7	0.4	0	1.6	0	0.2	0.2	1.0	3.6
Alabama	2	0	44.6	2.2	1.2	43.3	1.2	0	4.1	0	0	0	1.1	2.3
Mississippi	2	0	53.8	3.0	0	34.2	3.0	0	0	0	0	0	0	6.0
Average	25	.05	24.4	0.6	4.0	59.0	1.3	.05	2.2	2.1	0.1	0.7	0.8	4.7
East Central States														
Ohio	23	1.3	4.3	0	20.3	9.4	2.9	2.7	3.4	8.5	0	0.2	8.8	38.2
Indiana	48	0.2	2.5	0	12.3	18.3	2.3	2.8	5.3	12.1	0.5	0.2	6.5	37.0
Illinois	41	0.4	4.6	0	4.8	24.5	2.3	1.8	8.0	8.2	0.2	0.1	11.0	34.1
Average	112	0.5	3.6	0	11.2	18.7	2.4	2.4	5.9	10.0	0.3	0.2	8.6	36.2
West Central States														
Minnesota	9	0.9	0.2	0	2.3	36.9	2.0	3.2	7.5	9.9	2.2	0	13.4	21.5
Iowa	72	1.2	0.8	0	1.5	61.0	0.8	0.8	10.4	5.3	0.8	0	5.9	11.5
Missouri	24	1.3	0.3	0	0.2	73.1	0.3	0	7.0	6.1	1.8	0	2.2	7.7
Average	105	1.2	0.6	0	1.3	61.7	0.8	0.8	9.4	5.9	1.1	0	5.7	11.5
Western States														
South Dakota	3	5.3	0	0	1.3	51.3	0.9	1.4	8.1	0.9	1.8	0	6.7	22.3
Nebraska	9	1.7	0	0	0.2	66.5	0.6	0.5	11.7	8.0	3.5	0	1.6	5.7
Kansas	2	0	0	0	0	67.0	0	0	11.5	8.0	9.0	0	2.5	2.0
Colorado	4	2.1	0	0	0	76.8	1.2	0	9.3	1.2	1.8	0	3.6	4.0
Texas	22	0.5	0	0	0.1	90.8	0.2	0	4.4	0.2	1.5	0	1.0	1.3
Average	40	1.3	0	0	0.2	79.8	0.4	0.2	7.2	2.5	2.4	0	1.9	4.1

to the Chicago Office of the Federal Grain Supervision Grain Division, Bureau of Agricultural Economics, for review, after which they are sent to the writer. The commercially damaged kernels (previously separated by the licensed grain inspectors for the "total damage" determination) are plated to identify the fungi associated with the damage. The kernels are first surface-sterilized by immersion for ten to twelve minutes in a 10 percent solution of the commercial product, "B.K." (3.5 percent sodium hypochlorite), after which they are plated on slightly acidified potato dextrose agar, incubated for four days at room temperatures, and then the organisms are identified.

Results of 1937 Survey

Market inspectors, corn breeders and others interested in corn production are generally agreed that the 1937 crop was one of the cleanest on record, with respect to ear and kernel rot diseases. Although the exceptionally favorable weather that prevailed during and following the maturation period probably accounted in a large measure for the low incidence of ear rots in 1937, the possible influence of hybrid corn should not be overlooked. Hybrid corn is now grown on such a large acreage that the expected improvement of hybrids for resistance to ear rots should be reflected in the quality of market receipts of corn.

From the standpoint of area covered the 1937 survey was the most extensive one to date. In addition to the eastern, mid-western, and western States surveyed in former years, samples were obtained in 1937 from several southern States including Kentucky, Tennessee, Alabama, Mississippi, and Texas. Some very instructive data concerning the relative prevalence of Diplodia zeae and D. macrospora were obtained from the southern States. The data for all States included in the 1937 survey are summarized in Table 1. A graphical representation of the data on the relative prevalence of the three better known ear rot fungi - Diplodia zeae, Gibberella saubinetii, and Fusarium moniliforme, for different geographical regions is shown in Figure 1.

A discussion of regional differences in the incidence of several of the more important rot fungi follows:

Diplodia zeae. The 1937 crop throughout the Corn Belt proper was characterized by the lowest incidence of Diplodia zeae for the five years this survey has been in progress. D. zeae was practically negligible in the important corn shipping area extending from Nebraska to Ohio. In no State west of the Mississippi River did D. zeae reach even 1 percent in the relative prevalence of the various fungi plated from the damaged kernels. The Atlantic Seaboard States, on the other hand, ran true to form and D. zeae was the principal fungus again in the region including Maryland, Delaware, and eastern Pennsylvania. Approximately 33

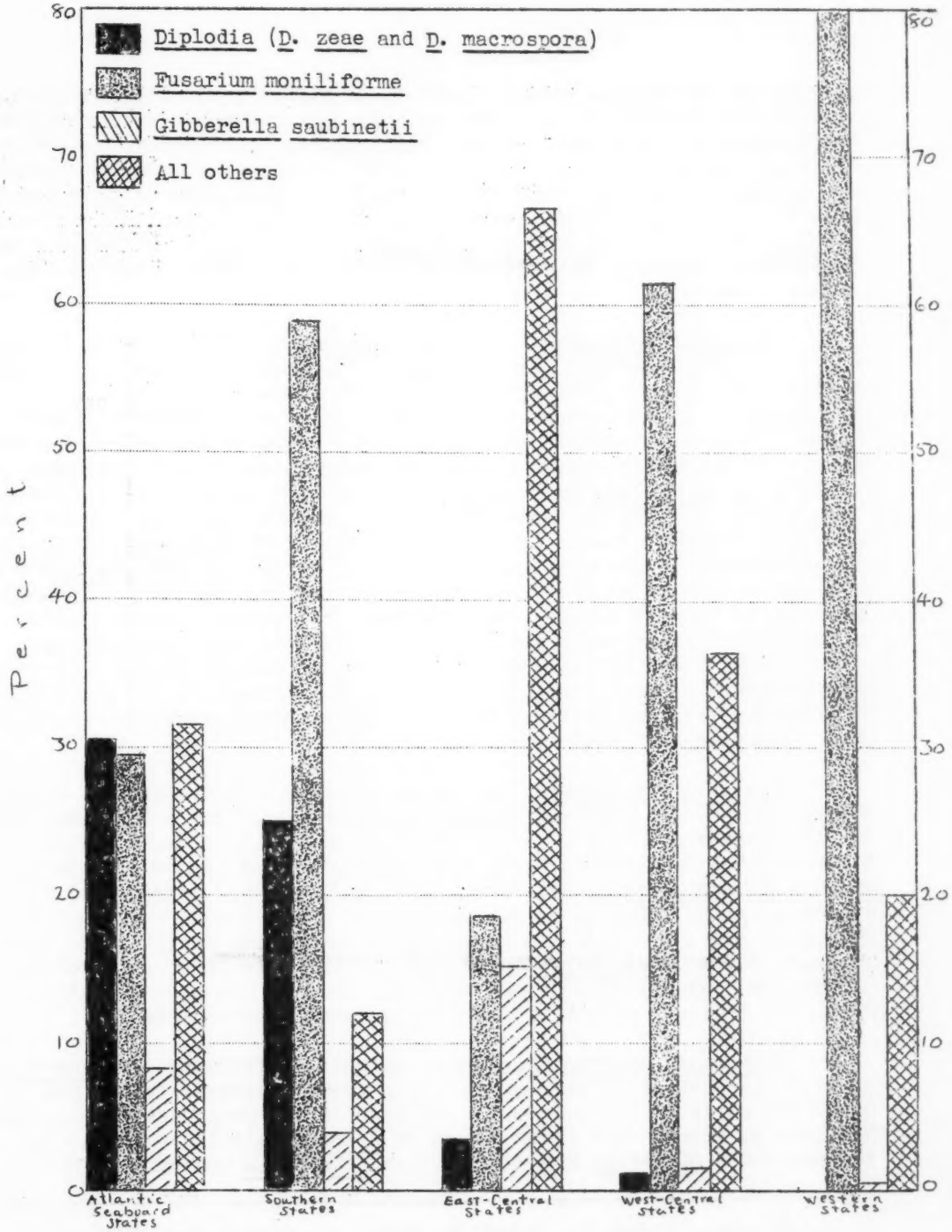

Figure 1. Relative prevalence of Diplodia (D. zeae and D. macrospora), Gibberella saubinetii, Fusarium moniliforme, and a group which includes all other fungi, bacteria, sterile kernels, etc. in the 1937 crop for 5 general geographic regions, as indicated by platings of the damaged kernels in samples obtained from carload lots of corn arriving at terminal markets from the regions indicated. (From data in Table 1).

percent of the damaged kernels from these Seaboard States developed D. zeae on the plates. In contrast with the low incidence of Diplodia in the samples from the east-central, west-central and western States, is the high incidence of this fungus in 1937 in the samples from the southern States, especially those from Alabama and Mississippi. Approximately half of the damaged kernels from these two States plated Diplodia--mostly D. zeae, but including some D. macrospora. No cultures of Diplodia were recognized, however, from any of the twenty-two samples obtained from western Texas.

Diplodia macrospora. While D. macrospora is not usually classed among the more important ear rot fungi, relatively few data can be found in the literature regarding the comparative prevalence of D. zeae and D. macrospora in those regions in which both species are known to occur. Larsh 3/ recently reported the results of a study on the relative prevalence of the two Diplodias in southeastern States in 1937 and found the ratio of D. macrospora to D. zeae in rotted ears to be roughly 1 to 25. This agrees with the writer's findings in the 1937 terminal market samples from southern States in which the ratio of D. macrospora to D. zeae, in the damaged kernels, was approximately 1 to 30. D. macrospora was recovered by the writer from both of the samples obtained from Mississippi, from one of the two samples from Alabama, from two of the ten samples originating in Tennessee, and from none of the samples from Kentucky, Texas, or from any of the eastern, central, or western States from which samples were obtained. According to the records kept by the Plant Disease Survey this is the first time that D. macrospora has been reported from Tennessee and Mississippi.

Fusarium moniliforme. In terms of relative prevalence F. moniliforme was the most important fungus in the samples from all States west of the Mississippi River, as well as in Illinois, Indiana, Maryland, Kentucky, and Tennessee. Ohio, with 9.4 percent of the damaged kernels plating F. moniliforme, and Texas, with 90.8 percent, represented the extremes in the relative prevalence of this geographically widespread fungus in the 1937 crop. As was noted in the former surveys, the percentages for F. moniliforme again were considerably higher in 1937 in the western and southern States than they were in the area including Illinois, Indiana, and Ohio, or in the Atlantic Seaboard region.

Gibberella saubinetii. The geographic distribution of Gibberella in 1937 was similar to that noted in the former surveys, it being confined generally to the more humid sections of the Corn Belt east of the Mississippi River. The distribution of Gibberella differed from that described for Diplodia, however, in that Gibberella was relatively more

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3/Larsh, Howard W. Relative prevalence of Diplodia zeae and Diplodia macrospora on corn. Pl. Dis. Rptr. 22: 159-162. 1938.

prevalent in the northern part of this area while Diplodia occurred more abundantly in the southern sections. Ohio, with 20.3 percent of the damaged kernels plating Gibberella represented the maximum in the relative prevalence of this ear rot fungus. Ohio was the only State in which Gibberella was the leading fungus in 1937. Incidentally, Gibberella also was the leading fungus in the Ohio samples in 1935.

Nigrospora sphaerica4/. The very favorable weather conditions which prevailed during the maturation period probably accounted largely for the low incidence of Nigrospora in the 1937 crop. No cultures of this fungus were obtained from many of the western or southern States included in the survey. The maximum for Nigrospora, 3.2 percent, occurred in samples from Minnesota. A culture of N. oryzae was obtained from a damaged kernel from Iowa.

Penicillium and Aspergillus spp. Separate records of the incidence of each of these fungi were kept for the first time in 1937. The fact that regional differences were found in the incidence of these fungi was not unexpected since these molds are frequently associated with storage rot diseases and these develop more commonly in some regions than in others. It was rather surprising, however, to find evidence of what appears to be an unmistakable trend for the ratio of Aspergillus to Penicillium to increase from the humid regions east of the Mississippi River to the drier areas west of the River. Figure 2 shows the regional differences in the incidence of Aspergillus and Penicillium and also their relative prevalence in the samples from the different States included in the 1937 survey. The relatively high incidence of Aspergillus in the samples from the less humid regions of the west is of interest in the light of Koehler's5/ findings that the moisture requirements for Aspergillus, for rot development in storage, were lower than for Penicillium and other common ear rot fungi.

An Unidentified Fungus. A fungus which has failed to fruit under ordinary methods of culture and has not yet been identified, shows up in sufficient numbers each year in the samples from the Atlantic Seaboard region to be considered of major local importance. Cultures of this fungus occasionally are plated from samples from the east-central States but it has never been observed in samples from west of the Mississippi River. Kernels infected with this fungus are marked conspicuously with small greyish-black flecks which, under a hand lens, are seen to be tufts of mycelium protruding through cracks in the pericarp.

4/Formerly called Basisporium gallarum, but it has been shown that Nigrospora has priority.

5/Koehler, Benjamin. Fungus growth in shelled corn as affected by moisture. Jour. Agr. Res. 56: 291-307. 1938.

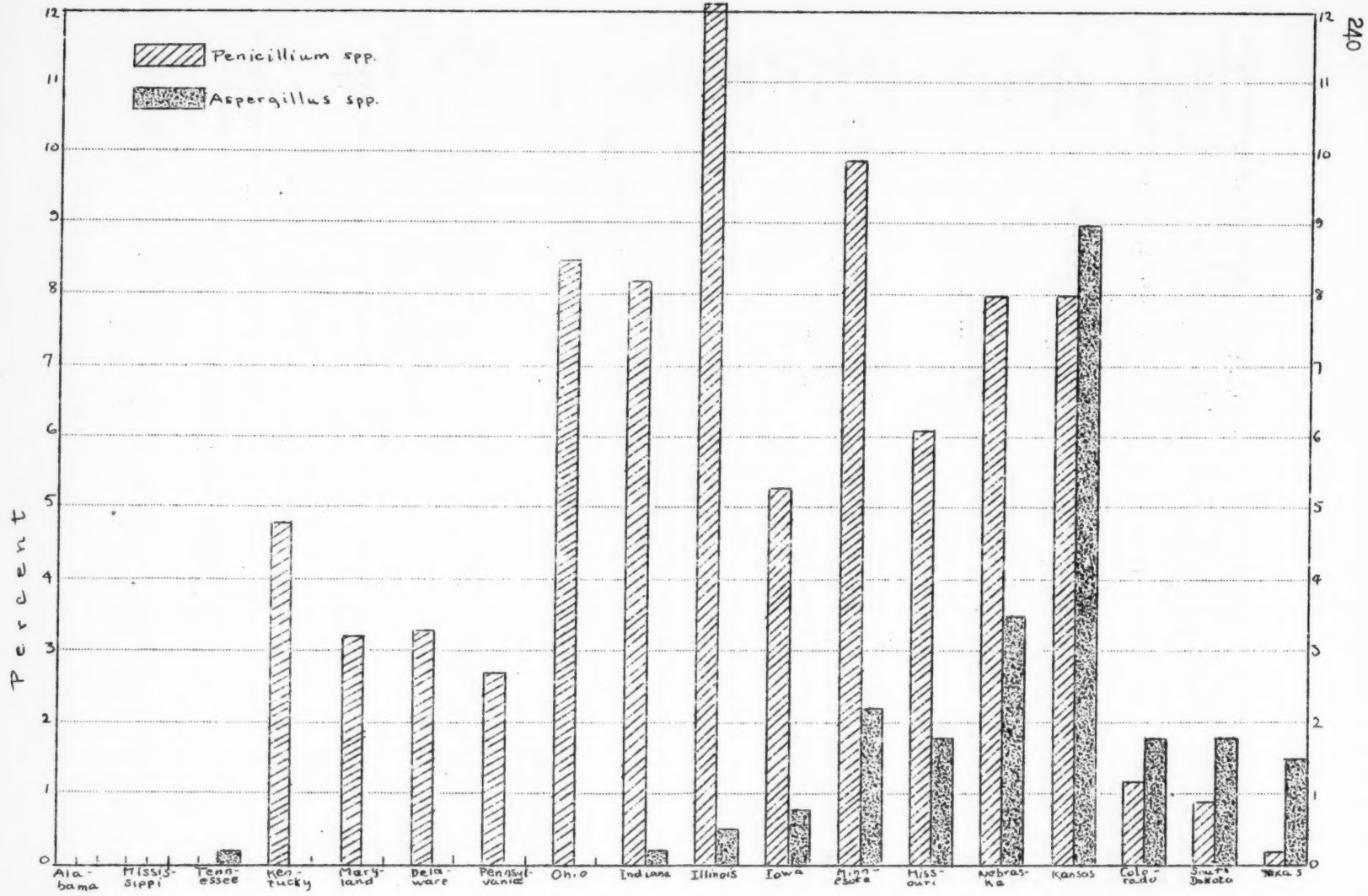

Figure 2. Regional distribution and relative prevalence of Penicillium spp. and Aspergillus spp. in damaged corn samples from the 1937 crop. (From data in Table 1).

Miscellaneous group. In this group are included a large number of fungi and bacteria some of which were identified but many of which were not. Species of Alternaria, Epicoccum, and Chaetomium probably were represented as commonly in this group as were any other of the weakly-parasitic fungi. When grouped with Penicillium, Aspergillus and all fungi other than the better known ear rot fungi, this miscellaneous group constitutes an important factor in the corn ear rot problem, especially in relation to the storage rots. Reference to figure 1 shows the very striking regional differences in the relative prevalence of the miscellaneous types and the better known ear rot fungi in the 1937 samples. The graph shows that the greatest differences were found between the samples from the east-central States and those from the southern States. Diplodia, Gibberella, and F. moniliforme, combined, were present in 87.5 percent of all the damaged kernels from the southern States and in only 33.5 percent of those from the east-central States. The remaining samples, in each case, were infected mostly with Penicillium, Aspergillus, and other miscellaneous fungi commonly associated with storage rots.

Figure 2. Regional distribution and relative prevalence of [illegible] damaged corn samples from the 1937 crop. (From data in Table 1).

BACTERIAL WILT ON SWEET CORN IN NEW YORK

Bacterial wilt (Aplanobacter stewarti) is becoming prevalent in southeastern New York, according to the following reports (from the Weekly News Letter, June 27):

Nassau County (Long Island). Farmingdale. Bacterial wilt is very common in a patch of sweet corn about eighteen inches high. Many of the plants show symptoms of this disease and much damage is expected. (Louis Pyenson).

Rockland County. Stewart's disease or corn wilt was first observed on Thursday, June 16. Since then it has appeared throughout the county. In some fields only a trace can be found, in others as high as 40 percent of the corn is infected. (Wm. J. Clark).

SEPTORIA NODORUM ON NODES OF WHEAT IN KANSAS

D. B. Creager

Considerable interest has been aroused in Kansas this season as to the possible cause of an abnormal, weakened condition of wheat culms, which is manifested by a characteristic shriveling and brown discoloration of the joints or nodes and the consequent breaking-over of the culms at these affected regions.

Preliminary studies have shown that pycnidia of Septoria nodorum Berk. occur in great abundance in the necrotic tissue. Since the presence of this pathogen has been found so consistently associated with such affected nodes, indications are that it is an important contributing factor, or perhaps the primary cause of the trouble.

(June 27. Kansas State College of Agriculture).

REPORTS ON RUSTS AND OTHER DISEASES OF SMALL GRAINS

DISEASES OF SMALL GRAINS IN TEXAS: Harvest of small grains in the central Texas area is practically completed. Only a few small fields of late oats and some wheat that is to be harvested with a combine are left standing at the present time. Yield of wheat is below and of oats above the average.

Leaf rust, Puccinia rubigo-vera tritici, on wheat, and crown rust, P. coronata, on oats appeared very early in the season, around the first of March. Stem rust, P. graminis, also appeared comparatively early in the season on both oats and wheat. Although volume yield of oats was not affected very much, grain dealers report weight reduced seriously in some cases. Rust infection of heads and stems together with cold injury in wheat in localized areas could be observed at a distance as brown spots in the fields. Weather, until the time harvest was started about the middle of May, was unusually wet and windy. Low areas suffered from excessive moisture. Subfreezing weather (30° F.) with high north winds on April 8 resulted in some cold damage to wheat. In some places heads were devoid of grains or only partially filled. Rust and late freezing resulted in abnormally low yields of wheat.

Some damage was due to scab [Gibberella saubinetii] in wheat and barley, Helminthosporium leaf blotch on barley, and anthracnose [Colletotrichum graminicolum] on wheat (as identified by Mr. E. S. McFadden of the Division of Cereal Crops and Diseases). Loose smut, Ustilago avenae, in oats was comparatively light. (C. H. Rogers, June 10. Texas Agricultural Experiment Station, Substation No. 5, Temple).

RUSTS ON WHEAT AND OATS IN INDIANA: The season has been almost ideal for development of the cereal crops. It has likewise favored the development of most of the diseases of the small grain crops. The spring opened with little or no overwintering leaf rust to be found. Because of favorable weather leaf rust developed rapidly, reaching 100 percent on susceptible varieties which it completely defoliated in the southern half of the State. In the northern half of the State leaf rust development was later in relation to the growth stages of the host and while abundant will no doubt cause less damage.

Stem rust developed earlier than usual and was widely and uniformly distributed indicating a general aerial introduction of inoculum. In the areas observed by the writer no appreciable damage is predicted because of the early development of the crop. In the southwestern area of the State Dr. B. B. Bayles reported stem rust "severe enough to do some damage" having become fairly severe on the peduncles about 10 days before maturity. It is too early to forecast stem rust damage in the northern one-third of the State.

Crown rust of oats has developed in epidemic proportions on winter and spring oats in the southern portions of the State. (Ralph M. Caldwell, Indiana Agricultural Experiment Station, June 22).

WHEAT RUST SITUATION IN KANSAS: On June 4-6, 1938, J. O. Miller, extension plant pathologist, and the writer made an extensive trip through a number of counties in the central and eastern wheat belt of Kansas. Those counties visited were Geary, Dickinson, Saline, Ellsworth, Russell, Ellis, Rice, Barton, Stafford, Pratt, Barber, Harper, Sumner, Sedgwick, Wilson, Neosho, Allen, Anderson, Franklin, Douglas, Jefferson, Shawnee, and Pottawatomie.

Leaf rust is the most serious that it has been in a number of years. Fields will undoubtedly have a reduction of from 5 to 20 percent. Some fields will escape with relatively less injury, particularly such varieties as Kawvale and Tenmarq, which show some resistance. Late planted fields of other varieties will scarcely head. The leaves have been killed very early in most fields so that the plants are coming into head with little foliage remaining.

Traces of stem rust were found on the above dates in practically every field. Nearly all conditions have been favorable, in fact, more favorable than usual, for the spread of stem rust this year because of its early occurrence in the State, the consistently heavy dews and large amount of moisture in the form of rain, with considerable cloudy weather. The one factor which has been unfavorable for stem rust spread, and which is largely responsible for its slow development, is the consistently low night temperatures which have prevailed. Temperatures in June have been much more favorable and the stem rust is spreading rapidly.

(June 9). Stem rust has increased decidedly in all fields over what it was a few days ago. Soft wheats are going to be hurt in eastern Kansas. They have shown the most stem rust from the beginning and have enough at present, considering the ten days to two weeks before harvest, that considerable damage will occur. The most stem rust found in the State was in southern Kansas in Barber, Harper, and Sumner counties where there were any green fields. It shows definitely that the infection has come in from Texas and Oklahoma and is spreading northward through Kansas. Those counties west of the ones which we visited and which have wheat that is later than the area we visited, are in a potentially dangerous situation.

(June 13). The next ten days will determine the extent to which stem rust will spread and injure the Kansas wheat crop. The northwestern part of the State, the entire northern tier of counties, and northeastern Kansas are in a potentially dangerous area. Some fields of soft wheat in the eastern part of the State are heavily infected and will produce lightweight wheat. Stem rust extends farther west in Kansas than in 1937 and with weather conditions continuing favorable, severe damage may be expected.

The orange leaf rust epidemic this year was the worst that Kansas has experienced in many years. It is believed that 12 to 15 percent reduction of the Kansas crop has resulted from leaf rust. Added to this, is the loss from the severe spring freezes, hail, water-logged soils, foot rots and floods. While the actual reduction in yields will not be known until threshing time, it is apparent that most fields will not produce so large a crop as previously estimated.

Stem-rust infection areas in States south of Kansas are west of what they were last year and reports are coming in that rust is getting worse, so with favorable climatic conditions and with the lateness of the crop in the western and northern counties of Kansas, losses are very likely to occur.

Widespread infection of Septoria glume blotch [S. nodorum] and bacterial black chaff [Bacterium translucens undulosum] occurs in most fields of the State visited. Some basal glume rot [B. atrofaciens] occurs. Whether these diseases will develop to a stage that will cause damage is questionable at this date. (L. E. Melchers, Kansas State College of Agriculture).

CONDITION OF WHEAT AND OATS IN KANSAS: Deterioration of the winter wheat crop in Kansas continues to be reported as the season advances. Harvest is under way in southern counties and yields are proving to be very disappointing. Many fields are making only five to eight bushels per acre and the grain is poor in quality. In addition to damage from frost, leaf rust, and excess moisture, stem rust now is becoming serious in the western half of the State. Heavy stem rust infection also has been reported on soft wheats in northeastern Kansas, but such infections usually are local. It is a very unusual condition to have heavier infections of stem rust of wheat in western Kansas than in the heavy rainfall belt of the eastern counties.

The 1938 winter wheat crop in Kansas and Oklahoma has been subjected to more unfavorable conditions than the writer can remember ever having seen in a single season. Warm weather during February and March resulted in too much early season top-growth. Severe freezes during April caused serious damage, some of which was not apparent until the crop neared maturity. Extremely heavy leaf rust infection further

weakened the wheat plants throughout the entire plains area. All of these conditions were followed by very heavy rains in May and June, resulting in "wet feet" in general and actual drowning out of the plants in large spots. In addition to these afflictions considerable damage is being caused by black chaff, glume blotch, and basal glume rot in southern Kansas, and an unusually large amount of scab and anthracnose has been observed in eastern counties. Bunt [Tilletia spp.] is more prevalent than usual and apparently is increasing in eastern counties. Loose smut [Ustilago tritici] is much more prevalent than usual and infections are the heaviest ever observed in Kansas. Many fields have 5 to 10 percent of the heads smutted.

Although the recent official estimate placed the 1938 wheat crop at 193,000,000 bushels it is generally conceded that the figure is much too high. Recent deterioration due to a combination of spring freeze, diseases, and unfavorable weather conditions have caused many private crop estimators to lower their figures to around 150,000,000 bushels.

Oats which gave promise of producing a bumper crop in nearly all parts of the State a few weeks ago now are heavily infected with crown rust [P. coronata]. Recent severe storms have caused much lodging and a combination of crown rust and lodging is certain to seriously reduce yields. Stem rust now is beginning to develop in many fields of oats and may be serious in about ten days. (C. O. Johnston, June 17. Division of Cereal Crops and Diseases).

WHEAT RUSTS PREVALENT IN CALIFORNIA: Stem rust is damaging wheat considerably in southern counties, and promises to be a yield factor in late sorts in the Sacramento Valley. Leaf rust is heavy in nearly all parts of the State, and stripe rust [P. glumarum] may be found in most sections. Smut is less abundant than usual in grain fields but is extremely heavy in native grasses in some sections. (C. A. Suneson, May 31. Division of Cereal Crops and Diseases. Cereal Courier 30: 70. June 10, 1938).

COTTON DISEASES REPORTED FROM TEXAS

C. H. Rogers

The excessively cool, wet, windy weather prior to the last week in May has been unfavorable for the rapid development of cotton in the central Texas area. Bacterial blight, Bacterium malvacearum, and sore-shin [Rhizoctonia solani] have been unusually heavy both in fields where seed were treated as well as where seed were not treated. However, in the early planted cotton there is approximately 100 percent better stand and only about one-fourth the infection in fields planted to treated seed as compared to those planted with seed not treated.

One very noticeable difference of treated seed (3 percent Ceresan and acid delinted) is the increased vigor of seedlings. Seedlings from treated seed are about twice as large as seedlings in fields that were planted with untreated seed. Farmers are much more impressed with results obtained from treating this year than within the past few years. The larger plants in those fields where seed were treated permitted earlier and more liberal cultivation.

In addition to bacterial blight and sore-shin, there is a rather extensive early appearance of a leaf spot similar to that caused by Cercospora.

Wet weather also favored an unusually severe infestation of lice on cotton seedlings. Every field of old cotton investigated has had nearly 100 percent infestation. Few plants were killed, but almost all plants suffered early cotyledonary defoliation and the loss of from one to three leaves in some instances. It is possible that spread of bacterial blight may have been aided by the lice infestation. With the advent of hot sunny weather the lice have entirely disappeared.

Cotton root rot, Phymatotrichum omnivorum, was found for the first time this season on June 6. On that date three different species were found dying from the disease, namely: Hubam (annual sweet) clover, false dandelion (Sitilias multicaulis), and sow thistle (Sonchus asper). The Phymatotrichum spore mats were found scattered over a Hubam clover field on the same date. Root rot-killed cotton was found for the first time this season on June 10 in a field eight miles northwest of Waco in McLennan County, and on the following day in Bell County on the Substation. That found in McLennan County had apparently been dead for about three days.

(June 15, Texas Agricultural Experiment Station, Substation No. 5, Temple).

TOBACCO DISEASES IN CANADA IN 1937

G. H. Berkeley

Mosaic. Mosaic was more general in its distribution in 1937 than it was in 1936. Though the average percentage of infection would not be high, nevertheless many fields contained as high as 50 to 70 percent mosaic. It is particularly interesting to note that almost without exception, the high percentages were found in fields which had grown tobacco in 1936. The association of prevalence of mosaic with a previous crop of tobacco has been observed each year for the past four years. Experimental field tests have also demonstrated the same thing. Mosaic was by

no means as general in the two tobacco growing districts of Quebec as it was in Ontario, though a few fields with heavy infection were observed. It is also interesting to note that overwintering of mosaic in the soil is not as important a factor in Quebec as it is in Ontario. Evidence was obtained which suggests that mosaic is spread more readily by cultivation when the plants are wet than when they are dry. This also has been demonstrated by experimental field tests. Where recommended preventive measures have been carefully practiced, mosaic has been greatly reduced, and in some cases almost eliminated.

Ring spot. A single case of ring spot (virus) in Essex County was reported by Dr. Koch.

Black root rot. In the burley and dark tobacco districts of Essex and Kent Counties in Ontario, where precipitation in the early part of the season was considerably above normal, black root rot [Thielaviopsis basicola] was prevalent causing considerable loss in some cases. In some fields where drainage was poor the plants in 'low spots' were suffocated by water-logged soil conditions. In such cases black root rot may or may not have been a contributory factor. In the new flue-cured belt black root rot was more abundant than last year, owing to the abnormal rainfall, but cannot as yet be considered of great consequence in this section. In Quebec, on the other hand, black root rot was scarce and unimportant because of the dry weather during the early part of the season. Even susceptible varieties on contaminated soil showed little if any effects from this disease. Though black root rot is the most important disease in most seasons in the two tobacco-growing districts of Quebec, it was nevertheless unimportant in 1937.

Brown root rot. Brown root rot, though present in most seasons in the tobacco-growing districts of Quebec, and in the new flue-cured districts of Ontario, is nevertheless unimportant in these sections. In Essex and Kent Counties in Ontario where it has become a general practice to precede tobacco with corn, brown root rot has become of considerable importance. It was quite widespread in its distribution again this year. Our observations coincide with those reported from certain states of the United States, namely that preceding crops of corn, timothy, etc., favour brown root rot. In Ontario corn is the most important crop in this connection. It has also been observed that brown root rot is more severe on the high spots of an infected field, and that certain varieties are more susceptible to this disease than others.

Frenching. This disease was observed in Quebec and Ontario both in the field and in the plant bed. Although frenching is by no means general in distribution and is considered one of our minor troubles, yet several fields were observed this year in which there was a high percentage of a severe type. Frenching was also observed in a mild form occurring

on tip leaves or suckers only, the rest of the plant giving no indication of its presence. Several cases of this type were noticed both in Quebec and Ontario on soil that had not previously grown tobacco.

Angular leaf spot. This bacterial leaf spot [Bacterium angulatum] was scarce in Quebec, only one or two cases being reported, while in Ontario it was encountered on several occasions both in the old and new belts, though its distribution was quite limited.

Wildfire. This disease [Bacterium tabacum] was not encountered in either Quebec or Ontario.

Physiological blackfire (possibly angular leaf spot?). A large blackfire type of spotting was found in a section of the new flue-cured belt in Ontario. The spots were large, angular, black and with concentric target-like lines suggesting blackfire, particularly since the spotting occurred late in the season following topping. This disease was responsible for severe loss on several farms. However, along with the blackfire type of spotting, smaller more typical angular leaf spots occurred on the same plant but more especially on the sucker growth. Whether or not both types of spots have been caused by the angular leaf spot organism, or whether the larger, black, concentric spot may be of physiological origin has not as yet been determined.

Physiological leaf spot. A small, brown, leaf spotting of flue-cured and burley varieties was again common this year in both Quebec and Ontario. The spots are at first dark brown in colour but later may turn white. This disease has been especially severe in certain fields of flue-cured tobacco, and its distribution in 1937 was quite widespread. Certain observations suggest that this trouble may be associated with a nitrogen-potassium balance.

John Williams leaf spot. This leaf spotting was observed in Quebec on certain broadleaf varieties, but more particularly on John Williams.

A somewhat similar type of white spotting, often occurring as rings or partial rings, was also observed on White Stem Orinoco, Yellow Mammoth, and Bonzana varieties at St. Catharines.

Lightning injury. A few cases of lightning injuries were brought to our attention.

Hollow stalk. This bacterial disease was observed both in Quebec and in Ontario, though only in a few fields. It was of no consequence.

Hail injury. A hail storm on July 2 caused considerable damage in the Delhi district, while hail just previous to harvest almost completely destroyed the crop in a few fields in the L'Assomption district in Quebec.

Nematodes. Mr. Stinson of the Delhi Tobacco Station reports finding the root knot nematode [Heterodera marioni] present on tobacco in the Delhi district. This is the first report of this nematode on tobacco in the field in Ontario. Last year Dr. Koch found it in seed beds in Essex County.

Seed bed troubles. With the exception of flooding and a 'yellow patch' condition in certain beds little trouble was encountered with seed beds in 1937. In the flue-cured belt many seed beds were seriously affected with a 'yellow patch' condition that in some cases caused complete loss of the bed. Microscopic examination of the roots of dwarfed and yellowed seedlings in an early stage of growth suggested that in some cases the roots had been attacked by parasitic organisms while in others the roots appeared to be free from organisms. A preliminary investigation has suggested that certain cases of the 'yellow patch' may be associated with the type of muck used (acidity too high), or with too heavy applications of manures and incorrect plant bed management, while in other cases there appears to be a definite brown root rot condition apparently caused by parasitic organisms which as yet have not been identified.

Also a few beds were found in which damping-off was a factor. A few cases of blackleg and black root rot in the seed bed were also brought to our attention.

General. Manifestations of potash deficiency were noticed in many fields, particularly in the new belt in Ontario. Magnesium deficiencies were observed as occurring in two types, one in which the lower leaves were almost completely blanched (sand drown), and the other in which the blanched areas were smaller and appeared more or less general throughout the plant. The effects of leaching were apparent on 'high spots' in certain light types of soil. Also an uneven ripening of leaves was observed in some fields.

Acknowledgements. Information re diseases in their respective districts is gratefully acknowledged from G. E. Turcotte, L'Assomption, Quebec, R. Bordeleau, Farnham, Quebec, L. W. Koch and P. Newell, St. Catharines, Ontario, F. A. Stinson, Delhi, Ontario, and R. J. Stallwood, Tillsonburg, Ontario.

(Laboratory of Plant Pathology, St. Catharines, Ontario).

TOBACCO SEEDBED SURVEY IN WISCONSIN, 1938

James Johnson

The seedbed season was relatively early and favorable as far as preparation and sterilization of the soil was concerned. The month of May, the important growing season for the seedlings in this State, was close to normal for both temperature and total rainfall (3.81 in.). Precipitation was frequent and the humidity relatively high for long periods. During two of these periods, particularly May 15 to 19, special attention was paid to the development of natural water-soaking of young leaves of tobacco seedlings under cloth covers as well as on other species of plants in the open. A large amount of such water-soaking was found on tobacco in seedbeds and in the field and garden on many other plant species. This water-soaking was evidently a result of root pressure as a consequence of the high soil moisture and low evaporating power of the air. Blackfire and wildfire infection of tobacco were found to follow such periods, and certain diseases of other plants were also found to be dependent upon this circumstance. It appears to be obvious that such "internal" water-soaking may develop frequently in nature and that infection with blackfire and wildfire may be determined by its presence as was the situation in Wisconsin this season. (No water-soaking as a consequence of beating rains occurred during the seedbed season in 1938).

Blackfire (Bacterium angulatum) could be found in practically every seedbed inspected in the State. Heavy infection was found, however, in only about one-half of the seedbeds. As usual, this disease does no actual damage to the plants and they outgrow it rapidly. The general field infection resulting may naturally result in damaging amounts of disease later in the growing season if conditions develop favorable to water-soaking either from internal pressure or from beating rains. The 1937 season crop showed little or no blackfire owing to the summer drought, and the actual origin of the general 1938 seedbed infection is therefore somewhat obscure.

Wildfire [B. tabacum] was more common than for several years. Eight infected seedbeds were found, all of them in the general vicinity of two 1937 infections. Cloth-covered seedbeds were damaged to a much greater extent than two uncovered seedbeds. Most of the growers plowed under the diseased beds.

Damping-off (Pythium or Rhizoctonia) caused little actual killing of young plants in the seedbeds but those in older plant beds, after the second or third pullings, often showed extensive injury from lesions of the disease on the stems.

The planting season started relatively early (June 1), was heaviest during the week of June 13, and was continued up to the last days of June especially in Vernon County.

(Division of Tobacco and Plant Nutrition).

REPORTS ON DOWNY MILDEW OF TOBACCO

TOBACCO DOWNY MILDEW IN PLANT BEDS AND FIELD IN MASSACHUSETTS: Following the report of June 8, downy mildew [Peronospora tabacina] appeared in several additional localities in Hampden and Hampshire Counties by June 10, and was reported for the first time on the following day from Franklin County, the northernmost section of the tobacco-growing area. C. V. Kightlinger confirmed the reports from Franklin County. No doubt the cool, wet period of June 3 to 4 encouraged its spread.

A report on June 18 from County Agent W. T. Locke of Hampden County, who is keeping closely in touch with the downy mildew situation in his county, indicated a further and serious spread in that area: "Practically every tobacco bed in the county has some infection.....Several beds have plants so badly injured that there are none fit to set." He also stated that one grower had reported development of the disease in the field, which appeared very likely to him since many growers had set plants in the field shortly before it appeared in the beds.

The last outbreak was no doubt due at least in part to the wet period of June 7 to 8; and the results of the still more favorable cool, rainy weather of June 11 to 13 have not yet been reported. On the majority of the farms where tobacco plants were grown in the usual glass-sash beds, the fields had been set and even largely restocked before the heavy increase of the disease occurred around June 11. However, W. T. Locke in his June 18 report stated that about two-thirds of the growers in that county use cloth coverings for the beds instead of sashes, and were about two weeks later in setting their fields. As a result, they were hard hit by the recent outbreak throughout that county. For example: "Consequently, the downy mildew has hit these growers who are just now setting their plants so that even if recovery came it would be ten days or two weeks longer before they could resume setting". He attributed the slower growth of plants in cloth-covered beds to the lesser amount of protection during the cool nights.

As indicated in the June 8 report, in practically all instances where the benzol treatment was given to infected beds, the disease was checked completely. W. T. Locke's report of June 18 from Hampden County indicated that the recent outbreak of downy mildew appeared generally to be worse in beds that had not been sprayed with cuprous oxide or gassed

with benzol. He also reported that at least in several instances the practice of leaving beds wide open during clear, warm days seemed to have little or no effect in checking the disease. (O. C. Boyd, June 22. Massachusetts State College).

ADDITIONAL RECORDS OF TOBACCO DOWNY MILDEW INFECTION OCCURRING UNDER FIELD CONDITIONS IN VIRGINIA: Downy mildew was observed in several fields in Patrick County, Virginia, June 15 in the western border of the bright tobacco belt, about thirty miles north of Winston Salem, North Carolina. In one field of about two acres, which was located on a high ridge, the disease was generally distributed on most of the plants, which were about two feet high. The grower stated that the disease was not observed in the beds from which this field was set until approximately one month after the plants were in the field. The evidence indicated there had been secondary spread since both old and new lesions were found in close proximity on many of the same leaves. The older lesions, which were frequently an inch in diameter, were necrotic, and in some cases the tissue had fallen out.

This particular area is located in the foothills of the Blue Ridge Mountains and has been noted in past years to have been the site of plant bed mildew infection, even during dry seasons when the disease did not occur generally in other sections. (R. G. Henderson, Virginia Agricultural Experiment Station; Paul R. Miller, Division of Mycology and Disease Survey; and James Godkin, Virginia State Extension Service).

VEGETABLE DISEASES REPORTED FROM NEW YORK

ALTERNARIA ROT OF POTATO TUBERS: Our attention was called in the spring to a rot of potato tubers in stored stock of a western New York seed grower. Cultures made from the affected areas gave Alternaria solani in every instance. This is the first time this rot has been observed in New York. The grower wrote us that the rot appeared only in the stock harvested in early October. It was stored at about 40° F. with plenty of humidity. He estimated the loss to be about 10 percent in one lot of 800 bushels of Russet Rural, 50 percent in a lot of 200 bushels of Warba, and 3 percent in a lot of 800 bushels of Irish Cobbler. The weather was warm and dry when the Warbas were dug. The rot was not observed until spring. Other lots of tubers harvested later showed none of the trouble. (M. F. Barrus, New York State College of Agriculture).

DOWNY MILDEW IN ONION FIELDS AND RUST ON WILD ONIONS: Onion mildew (Peronospora destructor) has broken out on the commercial crop of early onions in Madison County, being first seen June 22, in one or two isolated spots in one field. Onions in that district (Canastota) are nearly all grown from sets and are beginning to "bottom up" in many fields. Losses will depend much on the weather of the next month.

A survey of all the farm gardens of Marion township, Wayne County was completed in May by twelve prominent onion browers who found perennial onions growing on 49 properties out of 344 visited on the 70 miles of road traveled. Most of these were diseased. All but three have been voluntarily eradicated. More than twelve plantings were closer than one-half mile from muckland where commercial onions are grown. Some 33 more were removed from the village of Marion. There is no reason to suppose that the other fourteen townships of the county have any fewer plantings. If this ratio of plantings on 14 percent of the farms and 20 percent of the village properties holds, the entire county may easily contain over 1,000 plantings, the majority of which are perennial sources of primary inoculum during May and June. Surveys just completed around five other onion-growing districts revealed many topset garden plantings close to commercial onion fields. These will serve as controls against the Marion township area and Oswego township area, the only ones where eradication was attempted this year.

Wild species of Allium canadense and Allium vineale have been examined but never found with mildew on them even though in one case they (A. vineale) were growing a few feet from badly diseased topsets. During the surveys on May 17, a rust, identified by Dr. Barrus as Uromyces bicolor Ellis was found on Allium canadense at East Palmyra, New York. (A. G. Newhall, New York (Cornell) Agricultural Experiment Station).

VERTICILLIUM WILT OF WOODY PLANTS IN ILLINOIS

J. C. Carter

The first report of maple wilt in Illinois was made in 1926. At that time one tree, Acer saccharum Marsh, which was located at Gibson City, Ford County, Illinois, was found to be infected with Verticillium albo-atrum Reinke & Berth. Since the Natural History Survey began its intensive study of tree diseases in 1931, V. albo-atrum has been cultured from the diseased parts of twelve species of woody plants. These twelve species are listed in Table 1.

In 1937, V. albo-atrum was cultured from seven different host species. This was the largest number of species from which it had been secured in any one year. No previous records of Verticillium wilt of Catalpa speciosa Warder, Robinia pseudo-acacia L., and Viburnum lantana L. appear to have been published.

Table 1. *Verticillium albo-atrum* reported in Illinois according to host, locality, and year.

Host	Locality	Year
Acer nigrum Torr. & Gray (Black maple)	Jerseyville, Jersey Co.	1936
A. platanoides L. (Norway maple)	Park Ridge, Cook Co.	1935
	Brookfield, Cook Co.	1936
	Danville, Vermilion Co.	1937
A. platanoides schwedleri Koch. (Schwedler's maple)	Bloomington, McLean Co.	1937
A. rubrum L. (Red maple)	Kewanee, Henry Co.	1933
	Highland Park, Lake Co.	1937
A. saccharum Marsh. (Hard maple)	Danville, Vermilion Co.	1932
Catalpa speciosa Warder (Western catalpa)	St. Francisville, Lawrence Co.	1936
	Gards Point, Wabash Co.	1936
	Martinsville, Clark Co.	1937
Prunus communis Fritsch (Almond)	Moosehart, Kane Co.	1932
Rhus cotinus L. (Smoketree)	Princeton, Bureau Co.	1937
R. glabra L. (Smooth sumac)	Glenview, Cook Co.	1936
Robinia pseudo-acacia L. (Black locust)	St. Charles, Kane Co.	1932
Viburnum lantana L. (Wayfaring-tree)	Arlington Heights, Cook Co.	1937
Ulmus americana L. (American elm)	Mattoon, Coles Co.	1931
	Belleville, St. Clair Co.	1934
	Hillsboro, Montgomery Co.	1934
	Matteson, Cook Co.	1934
	Illinois	1935
	Chicago, Cook Co.	1936
	Aurora, Kane Co.	1936
	Princeton, Bureau Co.	1936
	Hollywood Park, Cook Co.	1936
	Lisle, DuPage Co.	1937
	Champaign, Champaign Co.	1937
	Urbana, Champaign Co.	1937
	Illinois	1937

(Illinois State Natural History Survey).

ADDITIONAL NOTES ON THE DISTRIBUTION OF WITCHES'-BROOM OF BLACK LOCUST

Theodore J. Grant

As a result of examination of herbarium specimens of black locust the writer found the following collections which showed characteristic symptoms of witches'-broom. Notes by the writer are in brackets.

Gray Herbarium of Harvard University (June 2, 1938).

1. Collection by E. Tatnall at Wilmington, Delaware, in 1886 from a plant growing in tidal mud. [So far as the writer knows this is the only record of this disease in Delaware.]

2. Collection by A. H. Moore, back of village of West Durbin, Pocahontas County, West Virginia, September 20, 1904. The habitat was noted as a dry hillside, mixed woods. The collector considered the plant a "teratological specimen".

Herbarium of the Arnold Arboretum, Forest Hills, Massachusetts. (June 3, 1938).

1. Collection by A. H. Moore at Tucker County, West Virginia, September 8, 1904, on shaded bank of sluice, "teratological specimen". [So far this collection is the earliest record found of the disease in West Virginia.]

2. Collection by Prof. James at District of Columbia in August, 1892.

Herbarium of the Academy of Natural Sciences, Philadelphia, Pennsylvania. (June 11, 1938).

1. Collection by J. K. Small, singular leaf sport on a tree on the mountains near Marysville, Perry County, Pennsylvania, August 8, 1889.

2. Collection by S. W. Knipe at Pittsburg, Pennsylvania, October 14, 1869. Leaves defective. [This is a good specimen of a severe broom and shows that the disease has been in this country for at least 69 years.]

U. S. National Herbarium, District of Columbia Collections. (June 15, 1938).

1. Collection by L. F. Ward, specimen with two forms of leaves, vicinity of Washington, July 30, 1882.

2. Collection by T. H. Knowlton, October 25, 1885, at Oxen Run, Washington, D. C.

3. Collection by Prof. James, August 1892, Washington, D. C. [Duplicate specimen of the collection found at the Arnold Arboretum.]

4. Collector unknown, specimen from Brookland, Washington, D. C., June 29, 1910.

(See also Reporter 22: 28-31, and 148, 1938).

(Hillculture Section, Soil Conservation Service and Division of Forest Pathology, Bureau of Plant Industry cooperating).

BRIEF NOTES ON PLANT DISEASES

RUST ON RUST-RESISTANT SNAPDRAGONS IN LOUISIANA: Severe infection of rust (Puccinia antirrhini) was found in two gardens in Baton Rouge on F. D. Roosevelt, Crimson, and another unknown variety of rust-resistant snapdragons. The plants in both gardens came from seed sent to Mr. F. Cochran, of the Department of Horticulture, by Lagomarsino & Sons, Sacramento, California. In view of Yarwood's[1] demonstration of the existence of physiologic races of snapdragon rust, it is probable that a physiologic race of rust, different from that present in the region where these varieties were developed, occurs in Louisiana. However, no attempt was made to determine this point.

It is perhaps of interest to note that in Louisiana snapdragon rust is of relatively infrequent and sporadic occurrence even on susceptible varieties. (A. G. Plakidas, Louisiana Agricultural Experiment Station).

PLUM POCKETS IN MASSACHUSETTS: This disease is limited primarily to the eastern and southeastern shoreline sections of the State. In past seasons, it has been particularly damaging to both the cultivated varieties and the native beach plums [Prunus maritima] on Cape Cod. This year,

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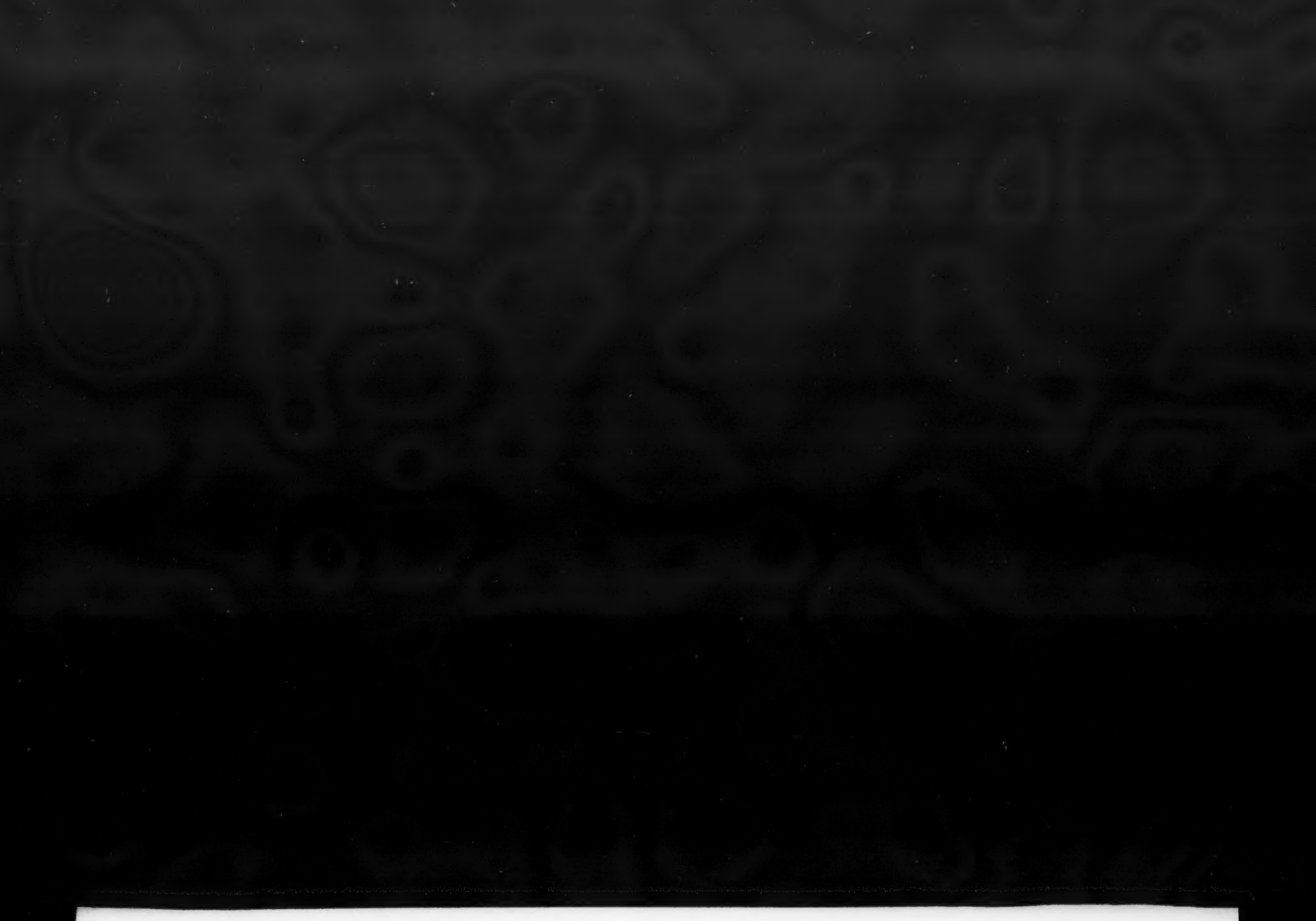
[1]/Yarwood, C. E. Physiologic races of snapdragon rust. Phytopath. 27: 113-115. 1937.

reports from County Agent Bertram Tomlinson and from W. H. Thies of the college pomology staff indicate unusual losses on the Cape, especially in beach plums. Not only is leaf infection more severe, with marked defoliation, but in many bushes the heavy set of fruit is a complete loss due to fruit infection. In the past little has been done to check this disease. Next year it is planned to start a campaign on the Cape for the control of plum pockets. (O. C. Boyd, June 22. Massachusetts State College).

X-DISEASE IN A PEACH ORCHARD IN NEW YORK: The new X-disease of peaches which has been so prevalent in Connecticut was identified in a peach orchard in Columbia County June 24 by Drs. Hildebrand and Palmiter. The infection on the trees was much more severe near a hedgerow containing some choke cherries. Many of the choke cherries were severely infected with the disease. This grower has lost quite a few trees over the last few years, probably as a result of this disease. (S. R. Shapley, Weekly News Letter, June 27).

SOUTHERN SCLEROTIAL ROT ON SUGAR BEET IN ARIZONA: Southern sclerotial rot [Sclerotium rolfsii] has appeared in three fields of seed sugar beets in the Salt River Valley. Beet seed from California has been used there. One infested field near Mesa has beets killed on numerous areas some of which are twenty feet square. (J. G. Brown, June 23. University of Arizona).